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OBSERVATIONS ON THE PRESENT STATE OF PHARMACY IN ENGLAND.

In a previous number, (Vol. XX. page 265) we have given an account of the history of Pharmacy in England, from early time to the year 1820. It is proposed to present in the ensuing pages some statements in reference to the rise and progress the pharmaceutical reformation that has taken place in England during the last ten years. We have been able to do this with great readiness from the pages of the Pharmaceutical Journal, which contain a full record of the proceedings of the reformers.

Perhaps in no other country are the interests of medicine so complicated by time-honored customs. Four classes of practitioners are in cotemporaneous operation, and despite the greater stringency of the law in confining professional bodies within their legitimate spheres, the two that practice pharmacy are constantly intruding upon each other's limits, giving rise to jealousies, suits at law, and other unpleasant evidences of an ill-conditioned system. Of the physicians, properly so called, and the surgeons, we shall have little to say, but the history of the "English apothecaries," or "general practitioners," as they are frequently called, is so intimately connected with that of the chemists and drug-

gists, or true pharmaceutists, that they will be frequently alluded to.

There is a force in the Anglo-Saxon character, which, if once brought to bear on any object, will gain its end, or bring about material changes in the condition of the things opposed to it; and the results of its energetic manifestations in favor of pharmaceutical reform have been greatly proportioned to the unanimity of sentiment, and combination of *will*, exhibited by the acting party.

In contemplating the position of the chemists and druggists of England, prior to 1841, we cannot but be struck, with the entire want of any generally understood bond of interest, except that instinctive sense of self-preservation which had from time to time called them together, to oppose, as best they could, the over-weening arrogance and selfishness of the apothecaries in trenching on their rights. They had no general principles of action, the pharmacopœia was their only pharmaceutical authority, except the comments upon it by writers on the materia medica; for the rest; each establishment had its own private formulæ, its own methods of manipulation, and the precincts of the laboratory were guarded with a jealous care, proportioned to the slight confidential intercourse that existed amongst the members of the profession.

In England the rights and immunities of professional bodies are based on a stronger law power than with us. The grants of Parliament are readily carried into effect, to the utmost extent when the prosecuting party desires it. Besides, long established usage has given the different branches of the medical corps, "the right of way," as it were, with the public. The physician expects and receives his guinea fee when called in, because it is universally understood in the community that it is the price of his service, and those who send for him prepare for this consequence. This high charge in a society that includes so vast a preponderance of the poorer classes, has led to the immense

increase of the middle class of medical practitioners—the apothecaries. In the earlier state of medicine in England, as in the United States, the practice of pharmacy was conducted chiefly under the supervision of physicians, at their offices, by young men who were students of medicine, or by medical men of inferior capacity, who, from poverty, or because they did not aspire higher, spent their days in this service.

About the close of the sixteenth century, the London physicians gradually repudiated pharmacy, by allowing it to fall into the hands of their assistants as a separate class, and thereafter, *the apothecaries*, as these were called, assumed a more distinct and well defined character. Certain parts of medical practice, which, as office assistants, they had formerly executed, they continued to perform in their independent capacity. In 1606 they were incorporated along with the grocers, and in 1617 they obtained a separate charter. They rapidly increased in numbers and importance from that time, and the almost helpless child of physic, soon attained to a manhood, that excited the jealousy of physicians, and called forth their strongest exertions of opposition.

It is natural to suppose that the tendency of such a body of practitioners would be to encroach on the real rights of physicians; the pharmacy of that day was too limited a sphere for them to revolve in, and although they possessed no power or right to receive fees for attendance, yet they sought to extend their medical practice, and derived their remuneration from the medicines they prescribed. Perhaps no more unfortunate concurrence of circumstances could have happened them in this arrangement for paying the apothecary. The temptation to over-medication was direct and positive; the inducement to overcharge was equally great, and for a long series of years, the English were over-dosed and over-charged, until the evil attained such magnitude as to call up a powerful reaction on the

part of the physicians, who, about the close of the seventeenth century, established dispensaries for the sale of simple medicines, and for compounding prescriptions, to which they sent their patients. At these establishments, medicines were sold at reasonable prices, and no exorbitance manifested in reference to prescriptions. They gradually acquired a degree of popularity that excited a bitter enmity in the apothecaries, whose sales and profits were materially curtailed by being confined chiefly to their own practice. When these dispensaries had acquired so firm a footing in public confidence, as to proceed alone, the physicians, whose aim had been solely to punish the apothecaries, severed their connection, and left the establishments in the hands of the class of persons, who, for a series of years, had taken charge of them, and devoted their time and talents solely to Pharmacy. These persons were the original pharmaceutists, or chemists and druggists of England, the progenitors of the very extensive and respectable body of men, now represented by the Pharmaceutical Society of Great Britain.

In 1794, so sensible had the apothecaries become of the progressive power and influence of the chemists and druggists, (a body of men, which they said in disparagement were unknown a century before,) that a general meeting of the metropolitan apothecaries was called at the Crown and Anchor tavern, to take measures to repress or circumscribe the chemists and druggists for their "unjust and innovating usurpation" of the rights and immunities of the apothecaries. One of the charges thus brought against the druggists was, "that were their aggregate profits divided amongst the apothecaries, as it ought to be, each of the latter would have an addition of 200 pounds sterling to his income. They spoke of this "evil" as not being confined to the capital, but as a morbific infection which had begun at the capital as a central point, and had diffused its deadly breath from thence to all the chief cities and towns; and

even hamlets and villages were not free from its influence." A committee was appointed, funds subscribed, parliament petitioned, but no *act* issued from that authority bearing on the interests of the druggists.

This movement of the apothecaries in 1794, appears to have been the primary cause of the combination of interests among the chemists and druggists of London, and may be looked upon as the germ radical of the Pharmaceutical Society, which association, however, did not come into existence till half a century after.

Quieted, but not satisfied, by their ill-success in 1794, the apothecaries again manifested their feeling by causing a bill to be introduced into Parliament in 1813, containing several clauses extremely objectionable to chemists and druggists, which was met by a general meeting of the latter, on the 4th of March of the same year. The committee appointed on this occasion, of which the late William Allen was chairman, acted in the most energetic and efficient manner. Funds were collected, an active correspondence established with their brethren in other cities of England and Wales, counter-petitions showered in on Parliament, which course soon exhibited its influence by the complete withdrawal of the offensive clauses, and left the chemists and druggists a much more united and consequently powerful body, than they were before, although as yet no bond of incorporation held them together. From this time, until 1839, no very important movements in reference to the English pharmaceutists occurred. In the last named year, a committee of the House of Commons was appointed to institute enquiries in relation to the medical profession, with the view of reforming abuses, revising existing laws, &c. The extensive evidence collected by this committee, when nearly ready for publication, was destroyed by fire, but sufficient information was retained to enable the committee to bring in a bill for the registration of medical practitioners, &c., commonly known as Mr. Hawes' Bill. It was the feeling

and interest excited amongst the chemists and druggists of London by this measure, that more immediately brought the Pharmaceutical Society into existence, and the history of this Society since 1841, is in reality the history of Pharmacy in England.

In February, 1841, Mr. Hawes brought forward the Bill before alluded to for the reform of the medical profession, which appears to have originated chiefly with the apothecaries, or general practitioners, and which contained clauses injuriously affecting the interests of the chemists and druggists. The chief of these was aimed at the habit of prescribing at the counter, or recommending doses of medicine in simple cases, and for suggesting the propriety of a dose of calomel or rhubarb, or from motives of humanity to dress a wound; this bill rendered the pharmaceutist liable to $100 penalty, recoverable by suit, or imprisonment in lieu.

Mr. Farmer, of London, having noticed the objectionable features of the bill, called a meeting of his special professional friends, who determined to publish a general call for a meeting to consider the subject, and take measures to defeat or modify the bill in its obnoxious points.

On the 15th of February, 1841, a general meeting took place, in which the most distinguished and influential chemists and druggists of London took part. Resolutions were passed deprecating the objects of the bill, requesting its mover to postpone the *second reading* for one month, and appointing a large committee to watch its progress, and adopt such measures as were wisest in the case.

The committee succeeded in the object of their appointment, by first causing the modification, and then the withdrawal of the bill, by a flood of petitions.

The union of feeling among druggists in all parts of England based on the correspondence of the central committee at London, formed a very admirable platform on which to erect a society designed to be co-extensive with the kingdom. It was, in fact, during the frequent meetings of this

committee that the idea of a National Society was broached, and the project talked of on several occasions. One of the great obstacles to such a design, in previous movements, had been the jealousy and mistrust that existed between the members of the pharmaceutical body in different cities, and even in the same place; but in this instance local prejudices seem to have been hushed almost entirely; and this chief difficulty removed, nothing was needed to establish an institution but a wise and efficient action on the part of the central committee.

One of the ostensible grounds for interference with the chemists and druggists, was their want of a scientific education, and of any regular means of instruction—charges which were but too true. Indeed, each establishment was an independent school for pharmaceutical study; innovations in the old routine were slow to gain credence, especially as no pharmaceutical organ existed on whose pages the dispensers could become acquainted with the discoveries of the day. In March, 1841, several members of the committee met at a "pharmaceutical tea party," at Mr. Bell's, and discussed the principles on which a society might be started, and on the 5th of April following, the committee met, and in a series of resolutions decided that the general interests of the profession required the formation of a Society; that this Society be founded forthwith under the title of the Pharmaceutical Society of Great Britain; that the objects of the Society be chiefly to benefit the profession by furnishing the means of proper instruction; to protect the individual and collective interests of the profession, and to relieve distressed members. They further resolved to call a general meeting of chemists and druggists for the purpose of forming a Society, &c.

In accordance with these resolves, a meeting was held at the Crown and Anchor tavern, on the 15th of April, 1841, whereat a report of the above mentioned committee was read, and it was resolved, on motion of William Allen, that

a *society be then formed*, called the Pharmaceutical Society of Great Britain.

After the meeting, the members of the committee to the number of *one hundred*, signed an instrument constituting themselves members of the Pharmaceutical Society of Great Britain, the list headed by William Allen, F. R. S.

Five thousand copies of the report were printed and circulated throughout the country.

Between this time and the 1st of June, the committee were engaged at frequent meetings in digesting a constitution and code of by-laws, and on that day, at a general meeting of chemists and druggists, duly convened, they were adopted in form, and the members of the committee constituted to act as the council until the meeting in May, 1842. To the energetic action of this body, must, in a large degree, be attributed the fortunate results which have followed the formation of the Society.

One of the chief causes concerned in producing the rapid growth of the Pharmaceutical Society, was the establishment of a *Journal* for the publication of its transactions. This periodical, now known as the "Pharmaceutical Journal," was commenced by Jacob Bell, its present editor, on his own responsibility, with a view to gratuitous distribution, as a vehicle of information to the profession. The first number extended to 34 pages, and contained a paper from the pen of the editor, on the constitution of the Society, which exhibited the designs intended by the council, and being spread far and wide, made known to the members of the trade throughout the island, the great and valuable objects of the Association. This essay defined the position of Pharmacy, and exhibited a succinct account of its condition in other parts of the world, in order to show how far behind many other civilized nations the English were in pharmaceutical reform. It proved clearly the vast advantages that result from combination in the promotion of our Scientific Art, and in qualifying members by the support

of a school of Pharmacy. It was designed to unite the chemists and druggists of England and Wales by one common and powerful bond, which should cause them to act in unison in repelling the attacks from without, by the advocates of medical reform; whilst they should by every laudable means remove the stigma that had been cast upon them by other branches of the medical profession—that they were ignorant and illy-fitted for the responsible business of Pharmacy.

"At the time that Mr. Hawes undertook to set the profession in order, (says Mr. Bell,) he was supported and urged forward by the advocates of a system, liberal on the one hand, and restrictive on the other. According to the plan laid down, a new order of medical men was to be raised up on the basis of the general practitioner or English apothecary, and although Mr. Hawes did not contemplate the annihilation of the existing medical institutions, his measures were calculated indirectly to undermine their influence, and reduce their power by creating another channel, open to all, by which professional rank and honor might be attained."

"Whilst the profession was to be thus thrown open and purged from what are termed its "corruptions;" it was also to be protected by means of stringent prohibitions, against unqualified practitioners, enforced by heavy penalties. These measures were chiefly levelled against the druggists, and were designed, among other objects, to settle the knotty question respecting 'counter practice,' which has been a subject of dispute from the time of the apothecaries of the sixteenth century to the present day. It was not supposed that druggists could make any effectual resistance on the occasion, as it was proverbial that they were a disunited body, and that they had no representative government or other means of concentrating their influence. On the other hand, Mr. Hawes and his party were backed by a large and influential association, (the Apothecaries,)

the ramifications of which extended throughout the empire, and which had the means of creating a sensation, by directing the power of the members in one channel when a simultaneous effort was desirable. A notion prevailed to a considerable extent in the medical profession, that the interests of the two parties were at variance, that in order to elevate and protect the *medical practitioner*, it was necessary to *subdue* and *restrain* the druggist. This prejudice had been handed down during nearly two centuries, and the jealousy which existed on both sides, had been a bar to any mutual accommodation or dispassionate argument between the two parties. The medical journals, and even the daily papers were constantly advocating some effectual legislative measures, and quoting cases illustrative of the ignorance and misdeeds of the druggists. Although these arguments were frequently one sided, and the cases highly colored, they were seldom answered, except, perchance, in an occasional anonymous letter, the pungency of which was extracted during its passage through the press. Pharmacy stood in a precarious position. Its real representatives—those on whom had devolved the chief responsibility of preparing and compounding medicines—were caluminated on every hand, and threatened with extraneous control and a variety of restrictions. Even their *right* to dispense prescriptions was called in question, and their other privileges were held on an uncertain tenure. Yet they possessed no acknowledged means of protection or representation, and although they were all sensible of the disadvantages of their anomalous position, none felt called upon to act for the general welfare. In this state of affairs, the bill of Mr. Hawes came before parliament, and the druggists suddenly aroused themselves from their state of apathy, and arranged a plan of defense which proved altogether successful."

The course followed by the chemists and druggists, when they had gained their primary object, is worthy of all

praise. Instead of again sinking into apathy, or raising triumphant cries of exultation, they calmly and wisely examined into their real condition, and the causes existing among them for the outcries of their enemies. The maxim that "in union there is strength," was first adopted. The leading minds saw the wisdom of pursuing a plan which should unite in one body, the respectable chemists and druggists of the whole kingdom. The second was that they should resort to means for self education—for the improvement of themselves and the advancement of the art they represented; thirdly, that they should provide efficient means for educating the rising generation who, as assistants and apprentices, were numerous throughout the country; and finally, that a benevolent fund should be provided for the relief of disabled members who might be deserving of the assistance of their brethren. There were wise heads concerned in the formation of the Pharmaceutical Society of Great Britain. They knew well the nature of the material from which they had to build their edifice, and constructed it in relation thereto. Perhaps in no country where the number of pharmaceutists is so great, does so large a proportion of those of inferior grade exist. For the better qualified to have drawn a magic ring around their limited numbers, by excluding all whose qualifications in scientific regards were too low, would have caused a division in the ranks at once, and made enemies of the majority. In movements of reform, numbers and means are all powerful; on many occasions the voice of an ignorant, equals in influence that of a qualified member, and as the intentions of the founders were catholic, they not only wished to improve themselves, and those that came after them; but to raise the standard of every existing druggist, if so be it were possible. They therefore, at first, opened wide the doors of entrance into the Society, requiring no further qualifications than acknowledged respectability, and the education usual at that day.

The constitution acknowledged as members:

1st. Chemists and druggists who are, or have been, established on their own account, and who shall subscribe the sum of two guineas annually.

2d. Confidential superintendents, who shall be elected by the council, and who shall severally subscribe the sum of two guineas annually.

3d. Honorary members, comprising medical and other scientific men, who are distinguished in branches of knowledge allied to pharmacy.

4th. Associates, who shall pay *one guinea*, and enjoy all the benefits except presence at general meetings and holding office.

5th. Apprentices, who, by paying one guinea annually, shall have the privileges of associates.

The educational objects of the Society were declared to be an elementary classical education—medical botany, chemistry, materia medica and pharmacy.

After the 1st of July, 1842, no person was to be admitted as a member or associate without having passed an examination in the above branches of knowledge, and no apprentice should be entitled to the privileges of an associate without having passed an examination in classical learning before his indentures were executed.

It will appear from this statement, that all were invited to enter the association who would contribute to its support. It is presumable that the original members include a great number of very ordinary pharmaceutists; but, by joining the society they are in its favor, and *not* against it; they contribute to its support, and as the Journal is distributed to every member without separate charge, it follows that each of these inferiorly qualified members has thrust on him, as it were, all the benefits desirable from so excellent a periodical, communicating monthly the latest discoveries and improvements.

By the financial report to the annual meeting in 1842, it

appears that between the 1st of January, 1841, to the 31st of March, 1842, there were added to the Society 1670 members, and 2280 associates, yielding an income of more than $22,000. With this large subscription, it is not surprising that the council of the Society have found themselves able to effect great changes in the formerly existing condition of things. The chief objects for which these funds were expended, were *rent*, *salary*, *wages*, the Journal, benevolent fund, increase of the laboratory, the museum, scientific meetings and the lectures.

The school of Pharmacy, a most interesting feature of the Society, was commenced by the appointment of three lecturers. One of the courses was on Medical Botany, and consisted of two lectures per week between May and July, at 8 o'clock A. M. A second was on Chemistry, from October to the end of March, one lecture a week at 8½ o'clock A. M.; and a *third* course on Materia Medica and Pharmacy, commenced in October and ended in March, one lecture per week at the last named hour; the lectures on Materia Medica preceded those on Pharmacy. Since the commencement of the school, the courses have been extended, and lectureships of Practical Chemistry and Practical Pharmacy added. The fees for lectures are $2.50 for members and $10 for those who are not. The time of holding the lectures will appear unusual to us who at that hour are entering on our day's business in earnest; but in London, where so large a proportion of the medicine consuming population turn day into night, the run of dispensing business commences at a later period in the day.

Perhaps there is no feature of the Pharmaceutical Society of more interest to those who partake in its privileges than the occasions styled "Pharmaceutical meetings." These are monthly reunions held in the evening at the Hall of the Society, at which all the members and associates are at liberty to attend. It is usual to invite guests of distinction, men of science, who feel an interest in the Society, or in the sciences

it was instituted to promote, to be present and take part in the discussions. Occasionally lectures are delivered on some new and strikingly interesting subject. The numerous list of members affords an abundance who are willing to devote a portion of time to increasing the interest of these meetings, and rendering them attractive. Chemicals, Pharmaceutical, Botanical, and Materia Medica specimens, scientific apparatus and illustrations, are among the objects of interest to be met with at the rooms at Bloomsbury square, and we frequently observe that these contributions are sent from remote parts of England or Scotland. There is but one business meeting at which all the members are admited, which is called the *annual* meeting, and occurs in May. The officers and council of the Society are elected annually on this occasion. The council or executive of the Society meet monthly. It is clear, that unless some other occasions were furnished for the intercourse of the members, calculated to promote fraternal feeling and enable them to compare sentiments, one chief object of the Society would have been defeated. The Pharmaceutical meetings, by their informal character, and real interest, supply this requisite, as to time, place, and attractiveness, and have certainly contributed to promote the cause of Pharmacy in England.

The Pharmaceutical Journal has already been alluded to. What the scientific meetings are to London and its vicinity, this periodical has proved to the provincial cities and towns. It was a sagacious move in the founders to so arrange the contribution of the members as to include the price of the Journal, and thus compel all to take it, and most of them to read of the progress of the parent Society, and of the improvements and discoveries of the day. There can be hardly a doubt that the Pharmaceutical Journal, as conducted by Jacob Bell, has been and continues to be the greatest boon that has fallen to the lot of the English Pharmaceutists as a whole. Its character is unique. No

other Journal with which we are acquainted presents so many peculiarities adapted to advance and elevate the condition of our profession and its votaries among a people like the English. The Editor is constantly seen in its pages—his watchful eye is over every interest—now commenting upon the action of Parliament in reference to medical legislation, or advocating the rights of the druggist pending a suit at law brought against him by the Apothecaries' Society, or perhaps attacks on his own Society by other writers. In England the rights of incorporated bodies are more generally insisted on than with us, and their privileges are looked after with a jealous watchfulness hardly paralleled in the United States. The Editor often finds employment for his pen in exposing corporative policy, and in giving advice to his brethren in reference to conduct in particular cases.

The Transactions of the Society, or the official statements of the progress of the institution, are published in this Journal, and comprise the proceedings of the annual meetings, the report of the council, the special acts of that body, and the transactions of the Pharmaceutical meetings. Besides these and the editorial matter, lectures on new and important subjects, and matter selected from cotemporary periodicals of the continent, are found in its pages.

One of the later additions to the usefulness of the Society, is the laboratory established under its auspices in 1845 for the study of *practical* Pharmacy and Chemistry. In 1832 when the trustees of the Philadelphia College of Pharmacy were about to erect the building in which we are now convened, it was suggested to fit up a room for a practical laboratory, where the members might resort to experiment, or to manufacture chemicals of the finer sorts—the apparatus to belong to the College, and the members to pay a fee for its use sufficient to keep it in order. The policy and advantages of this movement were called in question, however, by those who had the chief direction o

affairs. With the continental pharmacies, laboratories are generally connected, where the apprentices acquire in regular course the familiarity with manipulation so necessary in the pursuit of chemistry, either economical or scientific. In England, however, to even a greater extent than with us, the chemist and druggist depends on the wholesale dealer and manufacturer for his chemicals, and but little provision is made for the instruction of the juniors in practical chemical knowledge. In the school of the Society, the courses are short, and with a great many of the pupils opportunities for experiment are few and far between. In view of this, the council of the Society perceived the advantages that must eventually arise from the establishment of a practical school under the supervision of the Professors of Chemistry and Pharmacy, where the student could put in practice the precepts of the lectures. It also would afford a means to medical students and to amateurs to acquire a kind of informati on and skill only elsewhere to be found, within the precincts of the mauufactory or Pharmacy, into which, for this purpose access is always difficult and often impossible, for temporary applicants. With the large income of the Society, the Council were enabled to create a laboratory establishment of the most complete kind, furnished with all the appurtenances afforded by the metropolis, and for convenience and comfort not surpassed by any of the much celebrated European laboratories. The arrangements accommodate about 30 tsudents. The rooms are open from nine o'clock in the morning until six in the evening, for five days of the week, and on Saturday, the studies are conducted in the Library and Museum. The pupils are required to quit the laboratory at 6 o'clock P. M. that the assistants may have time to proceed with the arrangements and cleansing for the following day. The Professor assigns to each student the operations he is to perform, and directs the manner in which he is to do it. Store rooms are in connection with the laboratory, contain-

ing a stock of materials from which the pupils are furnished at the order of the Professor. No extra charge is made for using the apparatus, except for wilful or culpable neglect or injury. The products of all the operations are the property of the Society. On entry each pupil has a working table, and the necessary special apparatus assigned him, and for which he is held responsible. Since the commencement of this school in 1845 the class has varied from 25 to 40 per annum, and the fee, at first 40 guineas, has been reduced to 32 guineas for the term of ten months. A number of young men have left it, well qualified by their education to advance the interests of their profession.

By the annual report for July last, we learn that the practical school is in a flourishing condition, and that the majority of the pupils are from other parts of England, which is an encouraging feature.

Since the successful operation of the parent Society and School at London, the Chemists and Druggists of two other cities of England have established associations with the same object. The Bristol Association have made an arrangement with a medical school in that city, whereby their students can attend lectures on Chemistry, Materia Medica, and Botany; and in Liverpool the profession have just formed a society, and have announced gratuitous lectures by scientific gentlemen, no doubt as an experiment preliminary to a more permanent establishment. This plan of local associations will do away with one great difficulty of the parent society, viz: the great inconvenience of young men going up to London to finish their education. It will have the effect, undoubtedly, to diminish the number of country members, but London and its vicinity will afford a full support to the school there, and its superior facilities will yet remain as an inducement to attract the better class of the students from the provincial schools.

The Council of the Pharmaceutical Society have been

fortunate in securing the services of men of the highest qualifications for their school—Fownes, Pereira, Thompson and Redwood. Two of these, Fownes, and Anthony Todd Thompson, have deceased, and the burthen of the school now devolves on Pereira, Redwood, and Mr. Bentley, the sucessor of Prof. Thompson, in the chair of botany. Of the former, nothing need be observed; he is too well known by his *Materia Medica*, and his numerous contributions to the Journals, to need notice. His colleague, Mr. Redwood, now occupies the two professorships of Chemistry and Pharmacy, having assumed the duties of the late Mr. Fownes. Mr. R. is a Pharmaceutist by education; his sympathies are with his profession, and perhaps no one could be found better qualified to carry out the very important branches of instruction placed in his charge.

I think we may infer, from the statements that have been made, that the future prospects of our art in England are flattering. The emulation at present existing, the field for ambition that opens before the younger and better qualified, in the direction of Chemistry, will tend to its advancement, as well as to that of Chemistry, itself, and leads us to wish it was in our power to promise as fair a prospect for our own professional improvement in a national sense.

W. P. Jr.

ART. II.—ON CANTHARIDAL COLLODION.

Translated from L'Abeille Médicale.

WITH OBSERVATIONS.

By Charles S. Rand.

"Collodion, combined with cantharidine, appears to be employed with the most complete success as an epispastic remedy. It not only can be substituted for the ordinary preparations of cantharides, but offers the additional advantage of not requiring the employment of leather or linen, so necessary for the application of the latter. Its use is parti

cularly recommended as affording the means of placing a blister upon otherwise inaccessible parts of the body, or in situations from whence the movements of the patient might easily displace an ordinary plaster, destroying the required action, or at least removing it to another part.

"In using this preparation, it is sufficient to apply, by means of a camel's hair pencil, a layer of the liquid to the spot upon which the vesicating influence is desired. If, after dessication, which takes place in one or two minutes, it appears that the part is not entirely covered, the same operation should be repeated. A more certain and rapid action may be secured by the subsequent application of a little lard or simple cerate over the pellicle. More time is not required for the production of a blister with this preparation than with ordinary vesicating agents, and it moreover offers the advantage of being entirely unaffected by the movements of the patient.

"*Mode of Preparation.*—Treat, by the process of displacement, one pound of bruised cantharides, with one pound of sulphuric, and three ounces of acetic ether. In two ounces of this saturated ethereal tincture, dissolve twenty-five grains of cotton powder.

"So simple a process can be performed with ease in any pharmaceutical laboratory. In glass stoppered bottles it may be preserved unaltered for any length of time.

"Although intrinsically much more valuable than ordinary vesicating agents, its use is less costly, inasmuch as with one drachm and a half of collodion, an effect is obtained equal to that of half an ounce of blistering plaster. Repeated experiments, by physicians, with the cantharidal collodion have verified these statements."

The above paper was communicated by the Russian chemist, M. Hisch, to the "*Med. Zeitg. Rusl.*," and thence republished by the French journal, from which it is here translated. The portability, ease of application, and vesi-

cating power of this preparation, render it superior to ordinary vesicants, while the facility with which irregular surfaces may be evenly coated, so as to secure uniformity of action, is a prominent advantage. I have made many experiments with it, all confirming the statements of Mr. Hisch in its favor. It is speedy, convenient and powerful. Some improvements, however, might be made in its formula. The proportion of cantharides is unnecessarily large, a tincture made with double the amount of ether, being found to vesicate with equal power.

The contractility—a property possessed by all simple solutions of gun cotton in ether—is a serious objection, not only causing considerable pain to the sensitive vesicated surface: but retarding the action of the preparation. It is probably to relieve this that Mr. Hisch recommends the application of lard or simple cerate. I had at first supposed that a sufficient amount of oily or fatty matter existed in the cantharides to prevent this unpleasant result; but experience proves the contrary. The addition of Venice turpentine to the amount of about one per cent., effectually prevents this contraction, and renders the preparation perfect.

Two small circles of equal size upon the arm were coated; the one with collodion, prepared according to M. Hisch's formula; the other, with that modified by the addition above suggested. The former contracted powerfully, causing a constant painful impression upon the part, and did not vesicate until two or three hours after the latter, the pain from which was insignificant.

When the blister is perfectly formed, the film of collodion loosens, and curling at the edges, may, by a slight effort, be detached without rupturing the membrane beneath, whose surface contrasts very favorably with that produced by ordinary blistering plaster, which so frequently soils the skin.

If it be simply painted upon the skin, and the ether

allowed to evaporate, vesication does not take place sooner than with the officinal plaster: but if immediately upon its application a piece of oiled silk is bound upon the part, and suffered to remain an hour, so as to prevent rapid desication, a blister will be formed in three hours, sometimes even more quickly, and in one instance, in *one* hour.

The medical gentlemen of this city who have used this preparation, speak in high terms of its satisfactory performance, or, in the language of M. Hisch, "Repeated experiments by physicians with the cantharidal collodion have verified these statements."

ART. III.—SUGGESTED FORMULA FOR UNGUENTUM TABACI.

By William J. Allinson.

I have for a number of years prepared the Unguentum Tabaci exclusively by a private recipe, (the physicians precribing it being of course advised of its character,) and the ointment so prepared has been in great repute among my customers as a remedy for a "gathered breast." The success attending its use has induced persons removing from my vicinity to speak of it, so that I have repeatedly received orders for it from places hundreds of miles distant.

I subjoin my formula, which I offer to the notice of the Committee on the Pharmacopœia.

Take of Tobacco leaves, (sliced)	- -	℥x.
Cider vinegar,*	- - -	Oiv.
Basilicon ointment,	- - -	℥xiij.

Boil the tobacco in the vinegar to one pint—strain—reduce in a water bath to f.℥vj., and add this fluid extract to the melted ointment, stirring constantly till it is cool.

*I have employed pure cider vinegar of my own manufacture, which probably improves the consistence of the extract. The officinal dilute acetic acid would perhaps be better, as affording a *uniform* result.

On the suggestion and by the prescription of Dr. Joseph Parrish, I have recently kept an "Unguentum Tabaci Composita," for which I offer the following formula:

Take of Basilicon ointment,	- - -	℥xiij.
Powd. camphor,	- - -	℥j. et ʒv.
Extract of belladonna,	- -	℥ij,
Fluid ext. of tobacco, (made as above,)		fʒvj.

Dissolve the extract of belladonna in the fluid extract of tobacco, and add to the melted ointment, in which the camphor should be previously dissolved. Stir constantly till cool.

Dr. Parrish, in the late number of his "New Jersey Medical Reporter," in an article on "Milk Abscess," after referring to the employment of warm vinegar by the late Dr. Dewees, speaks favorably of the tobacco ointment prepared as above, and states that "after repeated trials, with a variety of unguents and liniments," he had abandoned them all except the above compound ointment, which, says he, "I use in nearly every case of mammary abscess, and generally with entire satisfaction."

I may remark that I have not known of a single case of disappointment from the use of the simpler ointment. I conclude with extracting the following passages from Dr. Parrish's Essay:

"The Belladonna is not always used, though I do not know that it is ever inadmissible. The tobacco ointment was first introduced to my notice by Wm. J. Allinson, an apothecary of this city,* who makes it in a manner somewhat different from the officinal formula: the menstruum used by him being vinegar instead of alcohol, as directed by the U. S. Dispensatory, thus meeting in some measure the suggestion of Dr. Dewees." * * * * *

"It frequently affords relief even after the acute, lanci-

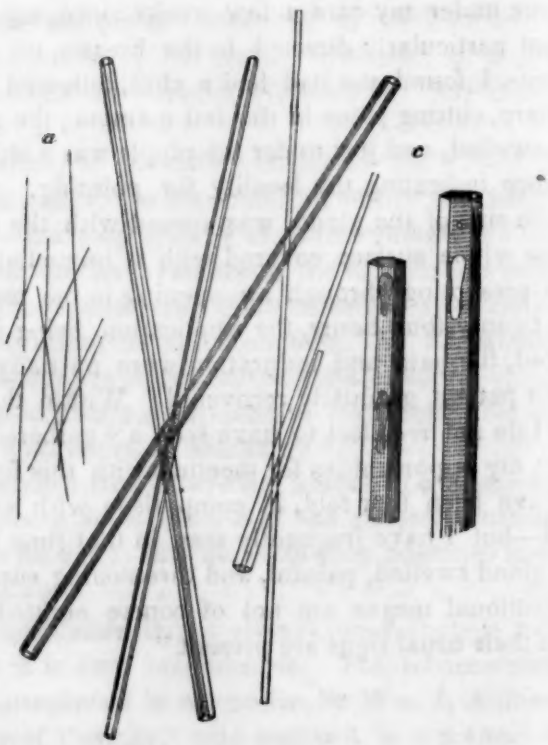
*Burlington, N. J.

nating pain and chill, which characterize the onset of the suppurative stage having been developed, and the tumor presents that glazed appearance which precedes the pointing of the abscess. I have a lady under treatment at this time who has suffered from milk abscess after each of her confinements, (four in number,) so that the breast has become entirely useless to her; not being aware of this fact when she came under my care a few weeks since, my attention was not particularly directed to the breasts, till on one of my visits, I found she had had a chill, followed by fever, and sharp, cutting pains in the left mamma; the gland was much swelled, and just under the nipple was a shining protuberance indicating the locality for pointing. A muslin cloth the size of the gland, was spread with the ointment, and the whole surface covered with it immediately,—the nipple presenting through an opening in the muslin. In about twenty-four hours, the application being frequently repeated, the pain and induration were partially relieved, and the patient gradually recovered. Within the last two years I do not recollect to have seen a "gathered breast," though my opportunities for meeting with this form of disease have been four fold, in comparison with any former period—but I have frequently seen in that time the mammary gland swelled, painful, and threatening suppuration. Constitutional means are not of course omitted in cases where their usual signs are present."

ART. IV.—NOTICE ON THE FORMATION OF SOME CRYSTALLINE BODIES IN COLLODION.

By Joseph Leidy, M. D.

Mr. Edward Parrish, pharmaceutist, of this city, a short



Reference to the Figures.

a. Long acicular crystals from collodion, as they appeared to the naked eye.

b. The same, highly magnified, exhibiting their hexahedral prismatic character.

c. Extremities of some of the larger crystals, highly magnified, presenting the appearance of the enclosed bubbles of liquid collodion.

time since brought to me for microscopic examination, a specimen of collodion or ethereal solution of gun-cotton, desiring to know if it was crystalline in its constitution as has been asserted.

The gun-cotton from which the collodion had been made was prepared by Mr. Parrish, by means of pure nitric and sulphuric acids, according to the formula given by him in some "Observations on Collodion," in the last number of this Journal, page 290.

The specimen, as presented to me, was about one ounce in quantity, contained in a glass-stoppered vial, was viscid, perfectly clear, and without sediment. Upon examination with the microscope, we could detect nothing, even with a power of 1200 diameters, except a finely and faintly granular constitution. The bottle remained upon my table for four weeks, when, upon examining it accidentally, I observed a deposite of a whitish flocculent matter at the bottom, and passing in various directions through the supernatant liquid numerous very long, delicate, acicular, shining crystals. Some of these were full an inch in length. Upon submitting them to the microscope, I found them to be transparent, highly refractive, hexahedral prisms, with truncated or pyramidal summits, measuring from the 1.6000th inch to the 1.857th inch in diameter. Very many of the larger crystals, near the extremities only, enclosed bubbles of liquid collodion, as represented in fig. c.

The flocculent sediment consisted of some undissolved cotton fibres, some very fine fragmentary filaments of the same, a few fine starch granules, vegetable epidermoid cells, a few spiral vessels, spiral fibre cells, and numerous crystalline bodies. Among the latter were many regular octohedrons, the largest of the perfect ones measuring at the sides 1-882d inch; when larger than this two or more of the angles were truncated. Some of the largest of the latter measured as much as 1.397th inch. Four-sided prisms with pyramidal

summits; cubes, measuring 1.500th inch, and four-sided tabular prisms.

The constitution of these various crystalline bodies I will not pretend even to conjecture, leaving this subject to the consideration of the chemist.

ART. V.—THE NATURAL HISTORY OF THE CINCHONAS.

Extracted from a work on this subject by M. Weddell.

In 1843, M. de Castelnau, having been commissioned by the French government to undertake a scientific expedition into the interior of the provinces of Brazil and Peru, the Museum of Natural History of Paris appointed M. Weddell to join the expedition, with special instructions to investigate several important botanical subjects, and other branches of natural history. After conjointly prosecuting these investigations for two years, M. Weddell separated from M. Castlenau, on the confines of Mattogrosso, in order to pursue his researches in another direction, and these researches he continued until 1848. The question of the cinchonas, which has been so much discussed, and is still so obscure, particularly fixed the attention of M. Weddell. It was with reference to this object that his course was principally directed, and the results of his laborious researches form the subject of the work alluded to in the heading of this paper. This important work, which, when finished, will form a magnificent folio volume with numerous engravings, appeared to us so important in a pharmaceutical point of view, that we did not wait its completion before giving some account of it. M. Weddell with much kindness having placed at our disposal the first sheets of his work, we have extracted some details, which will indicate the general character of

the work, and will excite much interest in the talented young man whose zeal, intelligence, and courage have accomplished so much.

Since the time of Condamine, who was the first to describe the cinchonas in Europe, until the illustrious travellers Humboldt and Bonpland, to whom we are indebted for the earliest accounts of the geography of this class of plants, a number of learned men of all countries have made this the object of their researches; and a catalogue alone of the works published on this subject would occupy many pages. But only a small number of those who have described the cinchonas have studied them in their native country, and it is the observations of these few which have furnished matter for the greater part of the other writers.

The origin of the bark of the cinchona was for a long time a mystery. It was Condamine who first threw any light on the subject, and to this further additions were but slowly made. Joseph de Jussieu in 1735 accompanied as botanist the Commission of the Academy of Sciences sent to measure a degree of the meridian under the equator. He visited about the same time as the celebrated astronomer, the cinchona forests of Loxa, those of high Peru, and almost penetrated into the frontier of Brazil. A succession of unfortunate accidents prevented the publication of the results of his researches. He did not return to Europe until 1771, after an absence of thirty-six years, and was then deprived of his reason.

Thirty years later, two expeditions were engaged to explore the cinchona regions in lower Peru and New Granada, the one directed by the celebrated Mutis, the other by Ruiz and Pavon. The immense investigations of these naturalists did not advance the history of these plants as much as might have been expected. Since the observations of Messrs. Humboldt and Bonpland, who visited the same country subsequently, the region from which the cinchonas are exported has been greatly increased, in consequence of

the discovery of new districts, and commerce has been enriched by several new species.

Previously to the year 1775 Loxa bark was the only kind of cinchona known in commerce. It was not until 1772 that Mutis discoved the valuable tree in the neighborhood of Santa Fé de Bogota, and at this period Europe began to receive cinchonas direct from the ports of New Granada, on the Atlantic. Some years later, the authors of *Flora Peruviana* studied the species of lower Peru, to the north of Lima, and these also were introduced into commerce. The only species, then, which, botanically speaking, still remained unknown in Europe, were those growing in the vast extent of country extending southward. Notwithstanding the efforts of Joseph de Jussieu and the botanist Taddaeus Haenke, little was added to the scientific knowledge of the cinchonas by their travels. The object of M. Weddell's work is to make known the species which have come under his observation in these regions during the years 1845, '46 '47. The immense commercial demands on the cinchonas of these parts, tending to exhaust the forests, rendered it necessary that new sources should be discovered. At a period when the consumption of these barks was becoming more and more considerable, it was desirable that attention should be directed to those cinchonas which will have to replace the Calisaya bark, the supplies of which are becoming less abundant. These species although they may be less rich in active principles, yet, from their abundance offer some security against the prospect of our being deprived of one of the most valuable medicines of the vegetable kingdom.

M. Weddell penetrated into Bolivia in the month of August 1845, through the country of the Chiquito Indians. The formation of the country in this province is quite incompatible with the existence of the true cinchonas. The greater part of its surface is so low and flat, that during the rainy season it is completely inundated. In the month of

November he journeyed towards the South, gained the Rio Grande, and crossed the country of the Cordillera, as far as Tarija, where he arrived in January 1846,—a laborious journey, the object of which was to determine with correctness the southern limit of the district of the cinchonas. M. Weddell gave the name of *Cinchona Australis* to a species which he discovered, like a distant sentry, at this extreme point, near to the nineteenth parallel of south latitude. In the month of August following he visited some of the large towns of Bolivia. At Cochamba a curious phase of his expedition began. He traversed near there the great chain of the Andes, purposing to reach La Paz, where the cinchona commerce is carried on to the greatest extent. The Andes present, at this part, a long and fine series of natural steps, by which the traveller gradually descends, passing successively in review all the varieties of climate, and all the corresponding shades of vegetation. The different species of cinchona are rapidly presented to observation. Almost immediately on his entering the province of Enquisivare he had the opportunity of studying the trees which produce the Calisaya bark, the most valuable of all the species in consequence of the large proportion of quinine which it contains. He gave to this tree previously unknown, the name of *Cinchona Calisaya*. At Palca he learned that there was recently discovered, on the borders of the Rio Ayopaya, an immense forest of cinchonas which no one had yet explored. But it was in the province of Yungas, the richest and most fertile of the provinces of Bolivia, that he obtained the most precise information of the mode of procuring, preparing, selling, and adulterating the barks which he wished to study.

In 1847, after the rainy season, M. Weddell resumed the road of the great Cordillera. The town of Sorata, or Esquibel, situated on the eastern side of the Andes, and at the foot of one of its highest peaks, is considered one of the most prolific sources of the Bolivian cinchonas; but is, in fact, only a simple point of transit for the products of the valleys

of the interior. It was toward these that he directed his course, passing through the snows of Illampo. The Rio Tipoani, the Rectola of Bolivia, takes its origin here. One of the most dangerous roads conceivable is that along the ravine bearing the above name, and leading to the village of Tipoani, a pestilential place, which nothing but the love of gain could render habitable. The cinchonas met with in all parts of this region are as much sought after as gold itself, but the larger trees are already beginning to disappear. In order to study the yet undetermined points, M. Weddell embarked on a raft constructed for the purpose, on which he descended in safety the rapids of Rio Tipoani. He then visited the mountains of Rio Tumache. This expedition being terminated, he reascended the Rio Mapiri on his raft, and then took the route across the forests leading to Aten and Apolobamba, where he arrived exhausted with fatigue and overcome with the fever which he had caught in the regions of Tipoani. The country here assumes a more agreeable aspect. The forests have disappeared, or occupy only the horizon; the eye rests on pretty grassy slopes, interspersed with scattered shrubs, and frequently with charming groves, Here several species of cinchonas are met with, which scarcely exceed the shrubs in height, and of which the flowers embalm the air with their delicious perfume. The town of Apolobamba is the centre of one of the districts of Bolivia which was first explored. For a long time its forests have been stripped of cinchonas.

At the end of July 1847, M. Weddell visited the province of Coraboya, one of the most interesting in Peru. It is divided by the Cordillera into two regions, one of which comprehends a long series of valleys, which furnish the greater part of the cinchonas now exported from the Peruvian Republic. It would be difficult to give an idea of all the vegetable treasures buried in these solitudes. The thirst for gold originally peopled this district, but the forests have re-

gained their empire, and the hatchet of the *cascarillero* now alone breaks the silence.

We will here quote the words of the talented author: The name of *cascarilleros*, says M. Weddell, is given to the men who cut the cinchonas in the woods; an appellation equally applying to those who are specially engaged in this commerce. The former, and of these alone I will speak here, are in general men who have been brought up to this laborious occupation from their infancy, and are accustomed by a kind of instinct to guide themselves in the midst of the forest. Without any compass but that intelligence peculiar to man in a state of nature, they guide themselves unerringly in these labyrinths as if they were surrounded by an open horizon. But how often does it happen that those less experienced in this art lose themselves and are never more heard of!

The only period which is not suited for the collection of cinchona bark is the rainy season, which in duration corresponds in some respects with our winter. If some persons contend that the period of the ascension of the sap is the best for stripping the trees, their precepts are certainly not practically adopted, for even during the rainy season the collection of the bark is only suspended on account of physica obstacles to its continuance.

The cutters are not generally engaged on their own account, but are mostly in the service of some merchant or small company. A confidential person is sent with them into the forests, who is called the *major domo*. It is his duty to receive and examine the barks which are brought to him by the different parties in the forest, and to superintend the distribution of the provisions.

The first thing done by those who engage in this kind of speculation in a region previously unexplored, is to have it examined by experienced *cascarilleros*, who are called *diestros* or *practicos*. The duty of these is to penetrate the forests in different directions, and to ascertain to what points

they may be profitably explored. They are expected to state whether there are any cinchonas, and in what quantity; also to point out the direction in which trees are to be found, and to report on the quality of specimens of the bark obtained.

This preliminary investigation is very important, and requires the possession of much sagacity, patience, and experience in those who are engaged in it. It is upon their report that the chances of success are calculated. If it be favorable, a road is immediately commenced up to the point which is to form the centre of the operations; and from this time all those parts of the forest adjacent to the road become provisionally the property of those who have formed it, and no other *cascarilleros* can work there.

On the arrival of the *major domo* with his cutters in the neighborhood of the part to be explored, he chooses a favorable site for his encampment, as near as possible to a spring or river. He constructs a hut or slight house to shelter the provisions and the produce of the cuttings; and if he anticipates to have to remain for some time in the same locality, he commences the cultivation of maize and a few vegetables. Experience, indeed, has shown that an abundant supply of provision is one of the most important conditions of success in this class of undertaking. The *cascarilleros*, during this time, are distributed through the forest, one by one, or in small parties, each carrying under a small cloak, and suspended at his back, provisions for several days, and the coverings which constitute his bed. In this way these poor beings have occasion to put in practice all their courage and patience in order that their work may prove fruitful. Obliged to have the hatchet or knife continually in his hand, to disembarrass himself of the numerous obstacles which arrest his progress, the *carscarillero* is exposed, from the nature of the circumstances by which he is surrounded, to an infinity of accidents which too often endanger his life.

The cinchonas rarely constitute an entire forest, but form groups more or less compact, distributed in different parts of it. The Peruvians give these the name of *manchas*. In some cases, and most frequently, they grow separately. However this may be, it is in discovering them that the skill of the *cascarillero* is principally exerted. If the position be favorable, the tops of the trees first attract his notice; a slight movement peculiar to the leaves of certain species, a particular color of the foliage, the aspect produced by a great mass of inflorescence, enable him to distinguish the cinchonas from a great distance. Under other circumstances he confines his inspection to the trunks, of which the external layer of the bark, or *enves* as it is called, presents remarkable characters. Very frequently the dry leaves which he finds on the ground are sufficient to indicate to him the vicinity of the object of his search; and if these indications have been brought there by the wind, he knows in what direction to look. An Indian, under these circumstances is an interesting object for observation. Passing in and out through the narrow pathways of the forest, glancing through the foliage, and appearing to sniff the earth, he seems to walk like an animal pursuing its prey, and darts forth when he thinks he has discovered the object of his search, nor stops until he has arrived at the foot of the trunk which he had descried from the distance. It is not always, however, that the exertions of the *cascarillero* are productive of such favorable results. Too often he returns to the camp empty handed, and without provisions; and not unfrequently, when he has discovered on the side of a mountain indications of the tree, he finds himself separated from it by a torrent or ravine. Entire days may then pass before he can attain the object which, during this period, he allows not to escape from his sight.

In order to strip the tree of its bark it is felled with a hatchet, being cut a little above the root, and the bark previously removed from this part, so that nothing may be lost;

as at the base the bark is thickest, and therefore most profitable, it is customary to remove the earth from around the trunk, so that the barking may be more complete. The tree seldom falls immediately when cut through, being sustained either by climbing plants or by the adjacent trees; these are fresh obstacles to be overcome by the *cascarilleros*. I remember having once cut the trunk of a large cinchona in the hope of bringing its flowers within reach, and, after having felled three adjacent trees, had the mortification to find it yet standing, being held up by the interlacing creepers.

When at length the tree is down, and the useless branches have been cut off, the peridermis is removed by striking it, either with a little wooden mallet, or even with the back of the hatchet; and the inner bark, being thus exposed, is often further cleaned by means of a brush. The bark is then divided by uniform incisions circumscribing the pieces which are to be removed, and these are separated from the trunk with a common knife or some other instrument, the point of which is carried as close as possible to the surface of the wood on introducing it into the incisions previously made; and if the position of the trunk prevents the operator from removing the whole of the bark by the first operation, it is subsequently divided so as to admit of its being turned. The dimensions and regularity of the pieces necessarily depend more or less on circumstances; in general, however, for the convenience of transport and facility of preparation, they endeavor to make them from fifteen to eighteen inches long, and four or five inches wide. The bark of the branches is separated in the same way as that of the trunk, excepting that it is deprived of its exterior coating or peridermis.*

*Formerly, with very few exceptions, the bark deprived of its peridermis was not received in commerce; not that any virtue was supposed to exist in that part, but it furnished distinctive characters by which it

The details in the process of drying also vary slightly in the two cases; the thinnest pieces of bark from the branches or small trunks, intended to make the quilled cinchona, are simply exposed to the sun's rays, and of themselves take the desired form, which is that of a hollow cylinder; but the bark taken from large trunks, which is to

was easily known, and rendered difficult of substitution. The necessity which was thus imposed upon the *cascarilleros* of preserving this, in many cases, frail part, demanded on their part the greatest care. Thus in many places it was the custom to fell the tree two or three days before barking it, so that, desiccation having commenced, the different layers of bark might adhere together.

I think that the removal of the peridermis from the surface of the thick barks at the time of cutting, is not quite general. Some of the cinchonas of New Granada, which I have recently seen, retained the outer coating. However this may be, we perceive the necessity of studying the bark under both aspects. I am persuaded that many museum specimens, collected at a period when it was customary to preserve the peridermis, would no longer be thought of doubtful utility, if considered in this point of view.

The process formerly employed for separating the young barks from the wood, also differs much from that which is now practised; hence there is a certain difference in the formation of the cylinders prepared by the two methods. I have already described the way in which it is now done, and it is easy to understand that by this method the dimensions of the separated pieces may depend on the patience or skill of the *cascarillero*, or on the circumference of the branch or trunk from which they are taken. Formerly, on the other hand, each piece was cut by one operation, the *cascarillero* holding his knife by the two extremities, and drawing it rapidly towards him. The flat pieces obtained in this way necessarily varied in width, according to the size of the trunk from which they were taken, and the quills when dried were frequently no larger than a pen. The pieces also had sharp edges, and they were thicker at the centre. The defect of this method was the immense loss which resulted, for nearly as much bark was left on as that which they removed, the former being considered useless on account of its being deprived of the peridermis. But this loss was as nothing when compared with that which I have next to notice. I allude to the almost entire rejection, for some time, of the bark of thick trunks. The loss resulting from this cause was immense. Many of those experienced in this subject having affirmed that with age the

constitute the flat cinchona, or, as it is called, *tabla* or *plancha*, must necessarily undergo a certain degree of pressure during the process of desiccation, without which it would become mis-shapen, or take a cylindrical form as in the preceding case. To effect this, after first exposing the pieces of bark to the sun, they are placed one on the other in crossed squares, in a similar manner to that practised in timber-yards in the arrangement of the planks of wood, and on the top of this pile a heavy weight is placed. This process is repeated for several days until the bark is completely dried.

The above process is that commonly adopted in preparing the cinchonas; but it will be easily comprehended that this must vary, in some degree, according to the locality, or the nature of the tree operated upon. In many places the bark is not pressed at all, or but imperfectly so, and it is then generally out of form or slightly curled. The peridermis is often but partially removed, or simply scraped. Finally, whether it be accidental, or whether it be done with the view of augmenting the weight, there frequently remains a certain quantity of moisture in the bark which greatly deteriorates it. It thus appears that cinchonas which would

juices disappear by degrees from the bark, and that those barks only are efficacious which are taken from branches of moderate size, four times as many trees were sacrificed as would have been the case under other circumstances. It has been said, it is true, that the *cascarilleros* climbed the trees to cut off the branches, taking care to leave the terminal branch; but those whom I have known have always candidly confessed that they found the most simple method to be that of cutting the trees down, and this, I believe, has been the uniform practice. Thousands of quintals of cinchona bark have been thus left to perish in the forests; and it has only been since the inutility of the practice has been proved by chemical analysis that it has been discontinued. It is not to be considered, however, that the bark of old trees contains as much of the active principle as those which have only arrived at maturity. There are limits between which all are good; indeed, none ought to be rejected.

have presented the same characters if similarly prepared, may, according to the circumstances, vary very greatly. In any of these cases the labor of the *cascarillero* is by no means ended, even when he has finished the preparation of the bark; he has yet to carry his spoil to the camp, and with a heavy load on his shoulders, to retrace his steps along those parts which, while unburdened, he traversed with difficulty. The labor involved in this part of the operations can hardly be conceived. I have seen more than one district where the bark has to be thus carried for fifteen or twenty days' journey to get it out of the wood from which it was obtained; and considering the amount of remuneration received, I could hardly imagine men so unfortunate as to engage in work so laborious and ill-paid.*

Something yet remains to be said with reference to the packing of the bark. It is the *major-domo* who performs this duty. As the cutters bring him the bark, the produce of their labor, he submits it to a slight examination, and rejects that which is bad. It is then, if necessary, exposed to a fresh process of desiccation, and formed into bundles of nearly equal weight, which are sewn up in coarse canvass kept for that purpose. In this condition the bundles are conveyed on the backs of men, donkeys, or mules, to the depôts in the towns, where they generally receive an exterior envelope, consisting of a fresh hide, which as it dries makes a hard and compact package. In this form the packages are known by the name of *serons*, and it is thus that they arrive in Europe. The usual weight of a *seron* is from 70 to 80 kilogrammes (kilogramme 2 lbs. 3 ozs.

* In general, before the product reaches the coast it passes through at least three or four hands, and on each occasion its price is augmented; moreover, as carriage is very expensive, it follows that the price charged in Europe will afford no idea of its cost on the borders of the forest. At Pelechuco, for instance, 1 kilogramme (2 lbs. 3 ozs. avoirdupoise) is only worth a franc and a half (fifteen pence,) and for this twenty francs are now paid in Paris.

avoirdupoise ;) but the weight is sometimes much less than this. From these details it will be seen how erroneous the notions of some persons still are with reference to the collection of cinchona bark ; many having thought that it continues under special surveillance as it was formerly represented to be ; and others that the cinchona-trees are cultivated in enclosed parks and treated as the cork trees of our country. It must be acknowledged that the mode of collecting this valuable product appears to be always under the control of the half-savages by whom it is performed; and if efficient means be not discovered of counteracting the ruinous and wasteful method adopted, our descendants will inevitably have to regret the entire or at least partial extinction of the different varieties of cinchona.

The opinion of those who calculate upon the forests being restocked from seeds, and from suckers thrown out from the stumps of the fallen trees, is more nearly in accordance with truth; but, as will be seen, even this source of renewed supply can only be depended upon to a certain extent. Too often the suckers, recklessly cut down, perish with the trunks to which they are attached; and the young trees, which very slowly attain to a certain degree of developement, fall in their turn beneath the hatchet, never again to appear. The same may also be said of the seeds. A supervision and control exercised over the cutters by means of inspectors, would, to a certain extent, check this vandalism, but, unfortunately, could not practically be carried into operation. The inspection of the woods in our country is a very different thing from inspecting a forest in the New World, especially if this forest cover 20,000 square miles.

In fact, it appears to me that there are but two methods which could be adopted for preventing the rapid destruction of the cinchona trees. One is to limit the exportation to a quantity proportionate to the sustainable produce of the forest; the other, that of making the trees objects of regular cultivation. To limit the exportation would certainly be

the most efficacious method; but is it not to be feared that the disproportion between the consumption and production is already too great to admit of the balance being thus restored? and moreover, are not our wants too pressing to give way to considerations affecting only the future?* There remains then cultivation, and this must be resorted to. If there be a tree which is worthy of being acclimated in a French colony, it is, certainly, the cinchona, and posterity will be grateful to those who may succeed in putting this plan into execution.

In a subsequent article we propose noticing the particular notions of M. Weddell on the classification of the cinchonas; to which will be added the description of new species for which science is indebted to the learned researches of this naturalist.—*Pharm. Journ. from Journ. de Pharmacie et de Chemie.*

* In support of this view of the subject we may cite the case of the Company of La Paz, to whom the Bolivian government conceded the monopoly of the commerce of the cinchonas of Bolivia, with the power of annually exporting 4,000 quintals or 40,000 Spanish pounds. The restriction imposed in this case was never observed, and complaints have been made that the quantity allowed to be exported has been greatly exceeded. What would it be, then, if the restriction were entirely removed, as they are in most other parts, and especially in Peru, where the exportation, during some years, has attained to an extent which is almost incredible.

In New Granada, at the time when the commerce of cinchona bark was carried to the greatest extent, that is to say at the commencement of this century, the quantity exported from Carthagena alone amounted in one year, 1806, to the enormous extent of 1,200,000 pounds. In the present day, on the contrary, scarcely any is exported.

ART. VI.—TABLE OF COMMERCIAL CINCHONA BARKS WITH THE BOTANICAL SPECIES FROM WHICH THEY ARE BELIEVED TO BE OBTAINED.

I. GREY CINCHONA BARK.

§ I. Loxa Cinchona Barks. (Crown Bark *Angl.*—China Loxa, Kron China *Germ.*)

Loxa Cinchona Bark, grey compact	*Cinchona Condaminea* H. et B.
Loxa Cinchona Bark, brown compact, (*Dunkele Ten China* Germ.—*China pseudo-Loxa* Bergen.)	*C. scrobiculata* H. et B.
Loxa Cinchona bark, red chestnut.—Light Calisaya.	*C. scrobiculata* H. et B.
Loxa Cinchona bark, red fibrous of the King of Spain (*Quina astoposa* Pav. in collect. Lamb. Mus. Brit. Loxa Cinchona bark, yellow fibrous	*C. macrocalyx* Pav.

§ II. Lima or Huanuco Cinchona Barks. (Silver Bark, Grey Bark *Angl.*—China-Huanuco, Graue, China *Germ.*)

Lima Cinchona bark, grey brown, (*Cascarilla provinciana* Peruv.)	*C. micrantha* Ruiz et Pav. or *C. lanceolata* Ruiz et Pav.
Lima Cinchona bark, grey ordinary	*C. micrantha* Ruiz et Pav. or *C. lanceolata* Ruiz et Pav.
Lima Cinchona bark, white	*C. purpurea* Ruiz et Pav.
Lima Cinchona bark, very rugous, resembling the Calisaya bark.—*Cascarilla negrilla* Peruv. (? *Cascarilla lugartijada* Laubert)	*C. glandulifera* Ruiz et Pav
Cinchona bark, red of Jaen and of Loxa	?

II. RED CINCHONA BARKS.

(Red bark *Angl.* Rothe China *Germ.*

Red Cinchona bark, becoming white in the air	?
Red Cinchona bark of Lima	*C. nitida* Ruiz et Pav.
Red Cinchona bark true, non-verrucous (*Cascarilla verdadera*, Laubert	*C. nitida* Ruiz et Pav.
Red Cinchona bark, officinal)	*C. nitida* Ruiz et Pav.
Red Cinchona bark true, verrucous	*C. nitida* Ruiz et Pav.

Orange-red Cinchona bark, verrucous	?
Pale-red Cinchona bark with a white surface	
Brown Carthagena bark	
Red Carthagena bark	

III. YELLOW CINCHONA BARKS.

Yellow Cinchona bark of the King of Spain (*Cascarilla amarilla del rey.* Laubert.)	*C. Calisaya* Wedd
Calisaya Cinchona bark, or Royal Yellow bark (*Königs China* Germ.—Yellow bark *Angl.*—*China regia* Bergen)	
Orange yellow Cinchona bark—Cinnamon Cinchona bark (*quinquina—cannelle,*) light Calisaya (*cascarilla claro-amarilla* Laub.)	*C. micrantha* Ruiz et Pav.
Pitaya Cinchona bark. (*Quinquina de la Colombie ou d'Antioquia* Guib. Hist. Nat. des Drog.—*Cascarilla parecida à la Calisaya* Laubert.)	*C. Condaminea* Humb. et Bonp.
Woody Carthagena bark (*Quinquina de Colombie ligneux*)	
Orange Cinchona bark of Mutis (*Spongy Carthagena bark; New Spurious Yellow* Pereira)	*C. lancifolia* Mutis.

HUMALIES CINCHONA BARK. (Rusty Bark *Angl.*—China Humalies, Braune China *Germ.*)

Humalies Cinchona bark, dull grey	*C. hirsuta* Ruiz et Pav.
Humalies Cinchona bark, thin reddish	? *C. purpurea* Ruiz et Pav.
Humalies Cinchona bark, white	?
Humalies Cinchona bark, ferruginous	*C. micrantha* Ruiz et Pav.
Yellow Cinchona bark of Cuenca	*C. ovalifolia* H. et B.

IV. WHITE CINCHONA BARKS.

Ash-colored Loxa Cinchona bark (*Ash bark* Angl.—*Blasse Ten-China* Germ. —*China Jaen* Bergen)	*C. ovata* Ruiz et Pav.
Grey Cinchona bark, pale ditto	
White Loxa Cinchona bark	
White fibrous Jaèn Cinchona bark	
Cuzco Cinchona bark	*C. pubescens* Vahl., or
Arica Cinchona bark	*C. cordifolia* Mutis.

Pale Yellow Carthagena Cinchona bark.—(*Hard Carthagena bark* Angl.—*Quina amarilla* Mutis.—*China flava dura* Bergen.)	*C. cordifolia* Mutis.
Orange yellow Carthagena Cinchona bark (*Quinquina de Maracaibo.—China flava fibrosa* Bergen)	
Pitayon Cinchona bark, or false Pitaya Cinchona bark	?

The following, according to M. Guibourt, are the most active barks;

1. Calisaya Cinchona bark	5. Non-verrucous true red Cinchona bark
2. Yellow orange "	6. Red Lima "
3. Pitaya "	7. Grey Lima "
4. Verrucous true red "	8. Verrucous white Huamalies "

Pharm. Journ. Weddell, *Hist. Naturelle des Quinquinas*, 1849.

ART. VII.—ON THE PREPARATION OF THE HYPOSULPHITE OF SODA.

By M. Faget.

The composition of this salt as met with in commerce is not always the same; it varies according to the process employed in its production. When it is prepared with the bisulphite of soda and sulphur, the product consists of a large quantity of sulphate and but little hyposulphite.

It is best procured by boiling the neutral sulphite with sulphur. However pure the neutral sulphite may be, the hyposulphite will be mixed with a small quantity of sulphate. M. Pelouze explains the presence of this sulphate by the boiling water in the presence of sulphur and the hyposulphite. I have never however been able to detect the least trace of sulphuretted hydrogen, even on boiling the hyposulphite with sulphur for a long time. I should rather explain the presence of this gas by the simultaneous action of the water and sulphur upon the excess of alkaline

carbonate which is added to the bisulphite to transform it into the neutral sulphite.

The best process for procuring the neutral sulphite consists in dividing a solution of alkaline carbonate into two parts, saturating one with sulphurous acid gas, and afterwards neutralizing it with the second portion of the carbonate. When a solution of carbonate of soda is saturated with sulphurous acid gas, the liquid not only contains all the gas forming the bisulphite, but also that which the water of the liquid retains in solution. Hence when the first portion is neutralized by the second, we do not obtain a neutral solution, but a mixture containing excess of the bisulphite. It is therefore best to introduce the neutralized liquid into a large flask, to boil it alone at first, and not to add the sulphur which is to convert it into hyposulphite until the excess of sulphurous acid has escaped. In following this plan, almost the whole of the soda is converted into the hyposulphite. If requisite, the salt may be purified by recrystallization.

M. Plessy adopts a method of purifying the hyposulphite which is also used with great advantage in the preparation of pure carbonate of soda from the impure commercial crystallized carbonate. The salt is melted in its water of crystallization, and the heat is continued so as to evaporate a portion of the water. When the solution cools, the hyposulphite alone crystallizes, the mother-liquor retaining the impurities. If the hyposulphite does not contain any sulphate, it will not, when dissolved in a large quantity of water, precipitate salts of baryta.

I may mention an easy process for determining the identity of the salt. It is based upon the alteration which it undergoes when heated, and consists in ascertaining the weight of the residue obtained by calcination, and examining if it contains sulphur. From 15 to 30 grs. are introduced into a tube closed at one end. The tube is then carefully heated to drive off the water of crystallization; and when

the salt is completely dried, the heat is increased, and the tube heated throughout its whole length, so as to expel the volatilized sulphur which has condensed upon its internal surface. On calcination, the hyposulphite yields sulphur, sulphurous acid and a residue of sulphuret and sulphate. When the tube has cooled, it is again weighed. If the salt be pure, the residue should amount to about 44·6 per cent. of the salt. The presence of sulphuret in the residue is easily determined by treating it with water, and adding a drop of solution of subacetate of lead; that of sulphuric acid, by a salt of baryta. Of all the oxysalts formed by sulphur, the hyposulphite is the only one which yields sulphur on calcination. The neutral sulphite of soda (SO^2,NaO + 10HO,) which is inodorous, also yields sulphuret; but on calcination it neither gives sulphur nor sulphurous acid, and the residue which it leaves amounts to 40·5 per cent.—*Ibid. from Journ. de Pharm.*

ART. VIII.—OBSERVATIONS ON CARDAMINE AMARA, HORSERADISH AND MYRONIC ACID.

By F. L. Winckler.

The author has examined the dried herb of *Cardamine amara*, which had been collected just before flowering. Its taste was more bitter than acrid. According to his experiments, it contains a sulphuretted and nitrogenous acid, most probably identical or very closely allied to the myronic acid of mustard seed, combined in the plant with an organic substance, and which, both alone as well as in combination with bases, forms with myrosine of yellow mustard seed, but not with emulsine of almonds, an acrid volatile oil resembling the oil of horseradish. Considering the intense bitterness and the slight acridity of the herb, it is not probable that a substance acting the part of the myrosine is present in the herb.

Fresh roots of horseradish, which even on grating disengaged a volatile oil, lost their acridity on being heated for some time in the water-bath under alcohol. The alcohol which distilled over was not acrid, and contained no volatile oil, for it was not rendered turbid by water. The spirituous extract deposited, on distilling off the alcohol, a dirty green fatty mass, which was removed. The remaining filtered aqueous liquid left on evaporation an amorphous brownish-yellow residue. Alcohol of 0·863 spec. grav. dissolved a portion, leaving an insoluble residue of sugar; the solution, on being again evaporated with myrosine from mustard seed, disengaged oil of horseradish, and still contained sugar, for on oxidation there was formed along with sulphuric acid some oxalic acid.

Absolute alcohol removed a substance from this mass without acquiring any perceptible color, and which collected in the form of a powder over the smeary sediment, and was separated by decantation. This latter substance will undoubtedly prove to be highly interesting, and the author promises to furnish a more accurate examination of it. From the experiments hitherto made, it appears to be a combination of sugar with potash, which seems to be combined with myronic acid in the horseradish. In the treatment above described this acid could be detected, by means of myrosine, in the smeary sediment beneath the absolute alcohol after it had been dissolved in water, whilst the alcohol contained no compound of myronic acid, but first took up the compound of sugar and potash and then deposited it, and on the addition of an alcoholic solution of potash deposited still more of the compound in the form of a snowy-white powder; there was still more sugar and potash contained in the smeary sediment. This sugar could not be obtained crystallized after separation from potash by means of sulphuric acid and removing the excess of acid by baryta. The compound of sugar and potash dissolves in hot alcohol when no excess of potash is present, which renders it

brown, without decomposition, and again separates from it as a fine white powder. The isolated sugar dissolves in cold alcohol. To obtain more of this sugar, the author agitated syrup with eight times its quantity of absolute alcohol, decolorized the clear decanted liquid with animal charcoal, and mixed it with a solution of potash in alcohol. In this manner he procured a large amount of this compound of sugar and potash, which possessed all the properties of the substance obtained from the horseradish.

According to the above experiments, myronic acid is most easily prepared by fermenting the residue from the alcoholic extract of the horseradish after distilling off the alcohol in order to destroy the sugar. On evaporating the fermented liquid, a bitter syrup is obtained, which contains acid myronate of potash. No volatile oil is formed in this fermentation.—*Ibid, from Journ. für Prakt. Pharm.*

ART. IX—PHARMACY IN HUNGARY.

The pharmaceutical reform, which has made so much progress in the north of Germany, has not yet extended its beneficial influence into Austria. In this country, the pharmaceutists are still almost completely dependent on the medical men, and the latter appear to have been even encouraged by the local authorities in the exercise of arbitrary and despotic conduct, which they have fearlessly indulged in towards the pharmaceutical body. Thanks to the liberty of the press, which was granted in the course of last year, and to the courageous effort of some of our brethren who asserted the rights of the body, the government has put an end to the most flagrant of the acts of injustice to which the pharmaceutists were previously exposed. Yet, although the condition of the pharmaceutists has been considerably ameliorated of late, much still remains to be

done, especially in those parts of the country where the imperial government cannot sufficiently exercise its vigilance with reference to the numerous abuses which continue to exist.

In Hungary, pharmacy is really in a hopeless condition. One of the principal causes which have contributed and still contribute to lower the pharmaceutical profession, is the existence of too great a number of pharmaceutical establishments. A second cause of the great depression of the state of pharmacy in Hungary is the very small amount of remuneration obtained by its practice. But the latter condition has been an inevitable consequence of the former. We may give the following case by way of example :—

In the circle of Guns, in Eisenberg, the population of which is at most 50,000 there are thirteen pharmaceutists, which makes an average of one to every 4000, and in the capital of this circle, a town of about 6000 inhabitants, there are two pharmaceutists. Several of these establishments are in a miserable condition, having neither stove, pans, press, or distillatory vessels. They are frequently without some of the most important drugs, and yet they undertake to dispense physicians' prescriptions. At only one of these thirteen establishments is an assistant kept, the proprietors of all the others are completely tied to their shops. The annual receipts of each of these pharmaceutists, is, on an average, only 500 florins (about £54 ;) and it may be said, without exaggeration, that the sale of birds, which in Hungary is practised in connexion with pharmacy, constitutes the principal means of support of the proprietors of these establishments.

Now, how is it possible in such cases, where the shops are in so deplorable a state—where the annual receipts scarcely exceed £54—where the pharmaceutist does not possess the necessary means of improving his position, and is hardly able with economy to procure animal food for his Sunday's dinner, how, we say, can a scientific character

be maintained? It is not to be wondered at, but, on the contrary, it was natural to expect, that the means which have been adopted on three several occasions for the organization of a system of pharmaceutical instruction, have proved ineffectual. Besides, if, in spite of the evils to which we have alluded, a scientific spirit was yet maintained among the Hungarian pharmaceutists, the last vestiges of it would speedily be obliterated through the ignorance and arbitrary acts of those in authority.

Thus, for instance, there resides in one of the capital towns a person appointed as a kind of sanitary commissioner, who, possessing no medical degree, after having served in the campaigns of 1805 to 1809, as medical assistant to the army, arrogated to himself the title of Doctor, and in 1810 was raised to the position he now occupies. This man, not content with enforcing the law in reference to Physicians and Surgeons, intermeddles with the affairs of the pharmaceutists over whom he has supervision, and in this capacity his ignorance and his arrogance are often manifested. As is often seen with those who have not regularly studied their profession, this pseudo-doctor changes his system as he would his coat; at one time an allopathist, at another a homœopathist. But there is here hidden a secret motive. Pretending that the pharmaceutists are not capable of preparing his prescriptions, and that, therefore, he can place no confidence in them, he asserts the right of dispensing his own homœopathic and allopathic medi cines, thus monopolizing the triple function of physician, surgeon, and pharmaceutist, and yet one of the pharmaceutists in whom this commissioner pretends that he can place no confidence, was formerly a legalized pharmacien of Paris, and has laid himself out especially for the preparation of homœopathic medicines.

The superior authorities of the government, in reply to the numerous complaints of the pharmaceutists, who have been so shamefully supplanted in the exercise of their art,

have frequently reproved this false doctor, and the magistrate of the town; but these gentlemen have been content to return the communication, and have carried effrontery to such a point, that the magistrate has not hesitated to declare in public, "although the government may send a thousand orders, we will act as we please." Can such things be credited?

About the middle of last year, a pharmaceutist residing in the circle of Guns, presented a petition to the royal government of Hungary, signed by himself and other practioners of the country, in which the petitioners, in claiming the redress of their grievances, propose at the same time divers measures to be adopted for the amelioration of their profession. This petition produced no effect, a result which may be partly ascribed to the confusion created by political changes. It nevertheless gave rise to the abolition of the practice of visiting the shops of pharmaceutists.

The different nationalities which subdivide Hungary still exercise a fatal influence in preventing unity among the pharmaceutists. The Magyars and the Germans, respectively, sympathise only with those of their own nation. It is melancholy to see such trifling questions cause dissension among our Hungarian brethren, who, above all things, ought to understand that their welfare depends upon union and concord. They have only to look to the scientific movements which have taken place among the pharmaceutists of Germany, Belgium, France, and other European countries, to be convinced of this great truth. Individual efforts will never be productive of important results; it is only by the combination of the different members of the body that success can be ensured to the just demands for redress.

There can be no doubt that the political dissensions which still remain in Hungary and Austria have contributed in preventing the pharmaceutists from obtaining redress for their well-founded complaints. We may hope that in

Hungary, when civil troubles have given place to a beneficial peace, the government will seriously give its attention to the domestic interests of the country, and introduce into the organization of the pharmaceutical body those reforms which are so imperatively called for.—*Journal de Pharmacie d'Anvers and Pharmaceutical Journal for Oct.*

ART. X.—RECENT IMPROVEMENTS IN THE MANUFACTURE AND REFINING OF SUGAR.

In a brief notice of the meetings of the British Association at Birmingham, in the last number of this Journal, we alluded to a paper read before the Chemical Section by Dr. Scoffern, "On the combined Use of the Basic Acetate of Lead and Sulphurous Acid in the Colonial Manufacture and Refining of Sugar." This process has been made the subject of a patent; and as it has attracted some attention in this country, while another process, not very dissimilar, has created a degree of sensation among manufacturers on the Continent, we have thought that a description of the proposed improvements may be interesting to some of our readers.

DR. SCOFFERN'S AND MR. SIEVIER'S PATENTS.

Dr. Scoffern's patent is dated December 7th, 1847; and the specification was enrolled on the 7th of June following. The invention relates to the employment of sulphurous acid as an agent for the separation of lead from solutions of sugar which may have been purified thereby.

In refining sugar, according to the patentee's process, the raw sugar is dissolved in a pan, and basic acetate of lead, in the proportion of about forty grains to every pound of sugar, being added, the mixture is kept at a temperature of 180° Fahr. for five minutes; it is then left to repose for about fifteen minutes, when, on examination, a curdy brown precipitate will be seen gradually sinking to the bottom, and

leaving the liquor above in a greater or less degree of transparency. The syrup is now filtered through bags, and is received into copper vessels. It will be found to contain a quantity of lead, for the separation of which sulphurous acid gas is passed through it. The patentee states that the precipitation of the lead by this means is complete. He recommends that, before the use of the gas is suspended, the filtered liquor should be tested for lead with solution of sulphuretted hydrogen, or sulphuret of ammonium. The lead being thus removed, the saccharine liquor will still retain free sulphurous acid and the acetic acid originally in combination with the lead. It is now rapidly heated to 180° Fahr., and chalk or powdered marble added to neutralize the acid. After concentrating it to a proper degree it is either crystallized at once, or further purified with animal charcoal.

In applying the process for the refining of cane-juice, the latter is first neutralized with lime or chalk, and the basic acetate of lead then added in the proportion of 150 grains to the imperial gallon of juice. The subsequent parts of the process are conducted in the same manner as in the case previously alluded to.

The efficacy of basic acetate of lead for the purpose for which it is used in this process cannot be doubted; and if the subsequent removal of the excess of lead from the solution can be completely ensured by the means specified, the process will probably possess some important recommendations, especially in the manufacture of sugar from the juice of the cane or beet root. In the discussion which took place on the subject at the Birmingham meeting, two objections were urged to the process;—first, that although a Chemist, operating in his laboratory, may completely remove lead from its solution by means of sulphurous acid, yet that the workmen employed in the manufacture of sugar would be likely occasionally to be less successful; and secondly, that acetate of lime would necessarily be left in the molasses.

Whatever the merits of this process may be, it appears that there are two patents for the discovery of it. Some months before the date of Dr. Scoffern's patent, Mr. Sievier took out a patent for certain improvements in the manufacture of sugar. This patent was sealed on the 12th of July, 1847, and specified on the 12th of January, 1848. Among other substances proposed to be used for purifying and decolorizing saccharine solutions, is mentioned, diacetate of lead, the excess of which is directed to be removed by passing a stream of sulphurous acid gas through the liquor. This process, and that patented five months afterwards by Dr. Scoffern, are, in fact, identical.

The circumstances of this case have been subject of conversation among scientific men for several months past. We are informed that Mr. Sievier, after taking out his patent, required, as is usual in such cases, the services of a professional Chemist, to perfect the details of the invention before entering them in the specification. A period of six months is allowed by law for this purpose; and in this instance Dr. Scoffern was the Chemist employed, at a salary of about fifteen shillings a-day, for making the necessary experiments, which were conducted at Mr. Sievier's house. The result of this transaction was that the confidential assistant subsequently claimed the most important parts of the process as his own, and proceeded to take out a separate patent for them. We refrain, for the present, from offering an opinion upon the justice of this claim, but believe it will, ere long, be contested in a court of law.

M. MELSEN'S PATENT.

We pass now to notice the other process to which we have already alluded as having excited considerable interest on the Continent. This process is the invention of M. Melsens, a Professor of Chemistry at Brussels. It consists in the use bisulphite of lime, which is added to the juice of the cane or beet-root, for the twofold purpose of preventing fermentation, and of separating, by coagulation, most of the

coloring matter and azotized principles which are always present. M. Melsens states he had found many metallic oxides and salts, especially the diacetate of lead, to be perfectly efficacious in removing those azotized constituents of the juice with which fermentation originates: but he thinks that lead could never be safely introduced into a manufacturing process such as that of sugar. He was, therefore, induced to seek some other agent which might be equally efficacous without possessing the deleterious properties of the salt of lead, and he conceives that he has found such an agent in the bisulphite of lime. The salt is formed, according to Leibig, by saturating an aqueous solution of sulphurous acid with carbonate of lime. It exists only in solution, and M. Melsens uses one the specific gravity of which is 1.075. Of this solution he adds about four parts to one hundred of the juice of the beet-root; and in operating upon the sugar-cane he uses one part of the solution to one hundred parts of cane.

The solution of bisulphite of lime is represented to possess the following valuable properties:—

1st. It is a most effectual antiseptic, preventing the production and action of all ferments.

2d. From its great avidity for oxygen, it counteracts any tendency to oxidation in the juice to which it is added.

3d. It is an excellent clarifying agent, causing the coagulation of all albuminous or coagulable substances when heated to 212° Fahr.

4th. It decolorizes all those coloring matters which preexist in the juice of the cane or beet-root.

5th. It prevents the production of coloring matter which would otherwise be formed in the juice in the process of evaporation to which it is submitted.

6th. It affords the means of neutralization for those acids existing naturally in the juice, which are injurious to the sugar, while the sulphurous acid, which in such case would be set free, is almost inert.

Hitherto, in the manufacture of sugar from the cane, a very imperfect system of expression has been adopted, by which not more than one-half, or two-thirds at the most, of the juice is obtained. This portion is obliged to be rapidly evaporated, or fermentation would speedily commence, and much of the sugar is thus destroyed or rendered uncrystallizable. The part left in the cane might be extracted by means of water, but in tropical climates the tendency to fermentation precludes the possiblity of recovering the sugar from such dilute solutions. It may be considered, therefore, that not more than one-half of the sugar originally present in the cane is obtained in a good and saleable condition.

M. Melsens recommends an entirely new method of proceeding. The canes, instead of being merely crushed as heretofore, are rasped. About one per cent. of the solution of bisulphite of lime is now added, which prevents any change from taking place. The rasped canes are pressed, and water with a little of the bisulphite of lime is added to the marck, and the pressure repeated once or twice, so as completely to extract the sugar. The liquors thus obtained are, in the next place, heated to the boiling point, when coagulation takes place, and the juice is thus defecated and decolorized. So completely unalterable is the solution said to be while there is any or the bisulphite present, that it is proposed to effect the evaporation spontaneously by the heat of the sun. The whole of the sugar is thus obtained, and nearly all of it in the crystallized state.—*Pharmaceutical Journal for Nov.*

ART. XI.—ON THE FERMENTATION OF THE MALATE OF LIME.

By Prof. J. Liebig.

As it is probable that some chemists may have procured during the present season a supply of malate of lime for the preparation of succinic acid, it may be useful to add to the information previously communicated, some further experience respecting the fermentation of the malate of lime.

From the juice of the berries of the mountain ash, which had been neutralized with milk of lime and then mixed with beer-yeast, there separated, after ten days' standing at the ordinary temperature, colorless crystals of pure succinate of lime, several lines in length; they were coated with a fine colored powder, which consisted of carbonate of lime. I have observed, that the amount of succinic acid is greater, the more slowly and quietly the fermentation is conducted. It is, therefore, of importance that the temperature during the fermentation, and the quantity of yeast or putrid cheese which is added, should not exceed a certain limit. 125 cub. centim. of yeast to 1 lb. of dry malate of lime and 6 lbs. of water, proved to be a very good proportion. The disengagement of hydrogen is decidedly injurious; it indicates another process of fermentation, in which no succinic acid is formed, or that which has been formed is destroyed. In one case, in which 19 lbs. malate of lime were fermented with twice the usual quantity of cheese, on the seventh day the fermentation became so violent that the mass overflowed from the great disengagement of gas. Nearly the half of this gas proved to be hydrogen. In this experiment, not more than 1 lb. of succinic acid was obtained from this large quantity of malate of lime.

The disappearance of the acetic acid in this experiment

was remarkable; the mother-ley contained in its stead a quantity of butyric acid. From 24 to 30 oz. of oily butyric acid (which, however, was not free from acetic acid,) were obtained from the mother-liquor. There is at the same time formed another volatile product, of an oily ethereal nature, which is procured by distilling the mother-liquor containing the lime salts; it is colorless, readily soluble in water, and has a powerful agreeable odor of apples. It is separated from water by carbonate of potash and by chloride of calcium (of which it dissolves a considerable quantity in the anhydrous state.) It is one of the so-called fermentoles, of which several, as first suspected by Berzelius, are probably compounds similar to alcohol or the aldehydes.

The formation of the succinic acid is explained in the following manner:—6 eqs. malic acid take up the elements of 3 eqs. water, and produce 4 eqs. succinic acid, 4 eqs. carbonic acid, and 1 eq. acetic acid:

6 eq. malic acid, $C^{24}H^{12}O^{24}$
3 eq. water, $H^{3}O^{3}$
$=$
4 eq. succinic acid, $C^{16}H^{12}O^{16}$
4 eq. carbonic acid, $C^{4}O^{8}$
1 eq. acetic acid, $C^{4}H^{3}O^{3}$

If butyric acid is produced directly from malic acid, there should be disengaged on the whole, carbonic acid and hydrogen in the proportion by volume of 1 : 2; but as at least 3 eqs. of the carbonic acid are retained by the lime, the proportion of carbonic acid and hydrogen obtained should be as 10 : 8 or as 5 : 4 vols.

If we imagine butyric acid to be produced from succinic acid, the carbonic acid and hydrogen disengaged should be in the proportion of 2 : 1.

4 eq. malic acid, $C^{16}H^{8}O^{16}$
Add to which $H^{4}O^{4}$
$=$
$C^{8}H^{8}O^{4}$, butyric acid.
H^{4}
$C_{8}O^{16}$

$C^{16}H^{12}O^{20} = C^{16}H^{12}O^{20}$

Of the 8 equivs. carbonic acid, 3 are retained by the lime.

3 eqs. succinic acid $C^{12}H^{9}O^{12} = \begin{cases} C^{8}\,H^{8}\,O^{4}, \text{ butyric acid.} \\ H \\ C^{4} \quad O^{8} \end{cases}$

Of the 4 equivs. carbonic acid, 2 equivs. are retained by the lime.

The following proportions of hydrogen and carbonic acid were obtained at different periods of the fermentation (accompanied by evolution of hydrogen :)—

150 H : 169 CO^2 = 4 : 4½
140 H : 140 CO^2 = 4 : 4
108 H : 186 CO^2 = 4 : 7
120 H : 220 CO^2 = 4 : 7½
111 H : 221 CO^2 = 4 : 8

From these relations it may be admitted that the butyric acid is produced both from the malic and the succinic acids, which would explain the decrease in the amount of the latter.

The following analyses of the products of this process of fermentation were made by Mr. Halerow.

The Acetate of Silver furnished—

Carbon,	14.3	4 =	14.4
Hydrogen,	1.9	3	1.8
Oxygen,		3	14.3
Oxide of silver,	69.3	1	69.5

The Butyric Acid gave—

Carbon,	54.1	3 =	54.5
Hydrogen,	9.2	3	9.1
Oxygen,		4	36.4

Chem. Gaz. Oct. 1st, from Liebig's Annalen.

ART. XII.—FORMULÆ FOR THE PREPARATION OF SEALING WAX.

By F. X. Pottinger.

Mr. Pottinger, of Triesch, recommends the following formulæ for the preparation of sealing wax:—4 ozs. of Venitian turpentine are melted with 7 ozs. of shell-lac in an earthenware vessel over a slight charcoal fire. Then 2½ ozs. of cinnabar and 1½ drachm of carbonate of magnesia are to be mixed with oil of turpentine into a thick paste; and having previously added to the first mixture 2½ ozs. dry cinnabar, the paste is immediately added; the whole being constantly stirred until bubbles arise, when the mixture is removed from the fire and stirred until the bubbles disappear. The mass is then poured into tin moulds, the interior of which must be greased with oil of almonds. When the sticks are hardened they are polished by being quickly drawn through a charcoal fire or spirit flame.

The following formulæ are warranted.

Fine Red.—4 ozs. Venitian turpentine, 7 ozs. shell-lac, 4 ozs. cinnabar, 1½ drachm magnesia with oil of turpentine.

Fine Red, No. 1.—The same formula, except 3½ ozs. cinnabar instead of 4.

Red, No. 2.—4 ozs. Venitian turpentine, 6½ ozs. shell-lac, ½ oz. colophony, 2½ ozs. cinnabar, 1½ drachm magnesia and oil of turpentine.

Red, No. 3.—4 ozs. Venitian turpentine, 6 ozs. shell-lac ¾ oz. colophony, 1¾ oz. cinnabar, &c.

Red, No. 4.—Turpentine and shell-lac like No. 3, colophony and cinnabar each 1½ oz., magnesia, &c.

Red, No. 5.—4 ozs. turpentine, 5½ ozs. shell-lac, 1½ oz. colophony, 1¼ oz. cinnabar, magnesia, &c.

Fine Black, No. 1.—4½ ozs. Venitian turpentine, 9 ozs. shell-lac, ½ oz. colophony, lamp black mixed with oil of turpentine as much as is required.

Black, No. 2.—4 ozs. Venitian turpentine, 8 ozs. shell-lac, 3 ozs. colophony, lamp black and oil of turpentine.

Yellow, No. 1.— 2 ozs. Venitian turpentine, 4 ozs. shell-lac, 1¼ oz. colophony, ¾ oz. king's yellow, 1½ drachm magnesia and oil of turpentine.

Dark Brown, No. 1.—4 ozs. Venitian turpentine, 7½ ozs. shell-lac, 1½ oz. brown English earth, (ochre) magnesia, as above.

Brown, No. 2.—4 ozs. Venitian turpentine, 7 ozs. shell-lac, 3 ozs. colophony, 1½ oz. English earth, (ochre) magnesia as above.

Light Brown, No. 1.—4 ozs. Venitian turpentine, 7½ ozs. shell-lac, 1 oz. brown earth, ½ oz. cinnabar, ½ oz. prepared chalk, magnesia as above.

Light Brown, No. 2.—4 ozs. Venitian turpentine, 7 ozs. fine shell-lac, 3 ozs. colophony, 1½ oz. English earth, ¼ oz. cinnabar, 1 oz. washed chalk, magnesia as above.

Dark Blue, No. 1.—3 ozs. Venitian turpentine, 7 ozs. fine shell-lac, 1 oz. colophony, 1 oz. mineral blue, magnesia as above.

Green, No. 1.—2 ozs. Venitian turpentine, 4 ozs. shell-lac, 1¼ oz. colophony, ½ oz. king's yellow, ¼ oz. mountain blue, magnesia as above.

Carmine Red, No. 1.—2 ozs. Venetian turpentine, 4 ozs. shell-lac, 1 oz. colophony, 1½ oz. Chinese red, 1 drachm magnesia, with oil of turpentine.

Gold, No. 1.—4 ozs. Venitian turpentine, 8 ozs. shell lac, 14 sheets of genuine leaf gold, ½ oz. bronze, ½ oz. magnesia with oil of turpentine.—*Pharmaceutical Journal, Sept.* 1849.

ART. XIII.—THE LABORATORY OF BERZELIUS.

In a very interesting notice which M. Louget has just published on this illustrious Swedish chemist, there is a description of his laboratory by M. Johnson, which will be read with interest :—

The Academy of Sciences, of which Berzelius is the perpetual secretary, and in the buildings of which he has his own laboratory, have lately bought for him a larger and more commodious house, and I arrived precisely at the time when he was occupied in removing to it—a period by no means favorable for my object, as his first laboratory was almost empty, and his new one not yet completely organised. Nevertheless, he offered with much kindness to make a series of experiments with me; a proposition which pleased me greatly, as it gave me an opportunity of observing his manner of operating, and of acquiring many valuable hints. During the course of these operations nothing was overlooked, and he appeared desirous of explaining the most minute details necessary for obtaining precise results, and endeavored to enforce the necessity for these little precautions, of which his experience had taught him the importance in analytical research. "Come," said he, "while this operation is in progress, I will show you two or three little things which, perhaps, you may not be sorry to know." And all this took place in the same day, so that I had at the same time the advantage of instruction and of passing my time in the most agreeable manner. Sometimes he showed me mineralogical specimens, amongst which he possessed some of great rarity, or else he related the results obtained by foreign chemists on the subject on which we were occupied; he would then endeavor to make me comprehend some passages which appeared obscure, or would even translate entire passages from an author whose works I could not read. Berzelius used to take private pupils, but for some time back he had relin-

quished the practice. The number of these pupils was very restricted, for throughout Sweden there are but eight or nine who have enjoyed this privilege, and about an equal number in Germany. Nevertheless, he liked to introduce strangers into his laboratory, and was much pleased in showing them the results of his long experience. Although apparently in the enjoyment of good health, he complained of the approach of old age. For the last two or three years his sight had required the aid of spectacles. His memory no longer served him as heretofore, and he was obliged to label all his bottles, which he had previously distinguished without this precaution.

Any stranger wishing to visit Berzelius should go by way of the *Drottning-Gattau*, at the commencement of which stands the church of Adolphus Frederick. The house forming the corner of this street is the large building lately purchased by the Academy. On approaching the house this way, he mounts two little steps which are opposite the door, and may forthwith enter: he need not fear the abruptness of his entrance, as a little bell will announce his arrival. He will discover, by the sight of various utensils arranged about the entrance, that he is in the laboratory of a chemist. If he be neither chemist nor even amateur, and is not frightened by the sight of the chemical apparatus, he will have nothing to fear from the emanations arising from them, which in most laboratories affect so sensibly the organs of respiration. Here they are all carried off by a most efficient system of ventilation, and even if any operation be in progress it may be approached without fear. To the right, adjusted with care near the window, may be seen a mercurial trough, from which the light is brilliantly reflected. Further on is a small porcelain table with raised edges, on which are probably some glass apparatus indicating the progress of certain experiments. After having glanced at the blowpipe, its large lamp, and the objects that surround it, we next arrive at the sand-bath. It is in

vain to search in this laboratory for brick or stone furnaces, which may be useful in operations on the large scale, but are not required in the delicate processes of analysis. The apparatus used by Berzelius consists of a hearth raised about three feet from the ground, and covered with a hood for carrying off vapors. On this hearth is a small sand-bath heated with charcoal, and a small iron furnace with holes for receiving tubes, retorts, &c.

In the second apartment the first object to be remarked is a glass case on a table, containing the balance. How great is the light which this fragile and simple instrument has contributed to the natural sciences! How numerous are the phenomena which it has explained, and the hidden truths which it has revealed! Who can count the discussions which it has terminated,—the hypotheses which it has destroyed? Who could have believed, in past times, that the determination of abstract truths and the development of the laws of nature would be due to the oscillations of this instrument? But examine this balance with attention, for it has rendered great service to science, and the modifications which have been made in it are of importance. The method of raising and maintaining in repose the beam and the pans is due to Gahn, whose skill in such work was well known. There are also small leaden weights, the exact counterpoise of all the crucibles and small platinum vessels of the laboratory, so that each might be readily tared. Around this room are placed in drawers or glass cases divers apparatus and chemical preparations in perfect order; and near the window is a table arranged for blow-pipe operations, on which Berzelius has written an excellent treatise.

We now turn to the left, and perceive, in a third apartment, Berzelius himself, who is probably occupied in writing. His table is covered with journals and borne down with the weight of books. By his side is a small cabinet, in which are contained rare chemical products. It is here

that rhodium, osmium, selenium, &c., are to be found, and he will take pleasure in showing you these and other specimens. Berzelius is constantly occupied. He works from twelve to fourteen hours daily; but, notwithstanding all he has done for experimental chemistry, it must not be supposed that he works unceasingly in his laboratory. Frequently when composing, he ceases to work in the laboratory for months together. If, while writing, as in the preparation of the last edition of his work on Chemistry, he meets with any passage that appears obscure, he quits his pen, and establishes himself in his laboratory, which he does not quit until he has obtained the desired result. He then returns to his editorial labors.

His apartments are admirably arranged, so as to admit of his passing from his study into his laboratory. It is in his study that he receives his morning visitors. By the side of this apartment is a long room, in which his apparatus is arranged ready for use, so that he can commence any operation without loss of time. It is thus that he has been enabled to lay out his time and make it of double value.—*Pharmaceutical Journal, October*, 1849, *from Répertoire de Pharmacie.*

ART. XIV.—STERLING'S PROCESS OF MAKING AMBER VARNISH.

In manufacturing amber varnish according to Mr. Sterling's method, the amber (which has to be submitted to high temperature to melt it) is introduced into a stout copper vessel, which is closed at top and luted with clay. This vessel is furnished at its lower end with a funnel-shaped vent, which carries a perforated sheet of iron or seive, sufficiently fine to prevent the escape with the melted amber of any impurities which might be contained in the amber.

This vessel is introduced into a large chafing-dish fixed upon a high stand, and its tapering bottom projects through a hole in the bottom of the chafing-dish, and extends a few inches downwards. When the vessel is thus adjusted, the chafing-dish is nearly filled with coal, and lighted. The fuel is, by the peculiar form of the chafing-dish, prevented from dropping into the oil vessel, to be presently described, and thereby soiling the liquid.

The heat from the ignited fuel very soon heats the vessel to such a temperature as will melt the amber and cause it to flow through the perforated metal or sieve above mentioned, in passing through which it will be purified from all extraneous matters. The melted amber runs into a copper vessel which is placed below the chafing-dish, and is provided with a long handle. This vessel or receiver is filled about two-thirds full with the oil from which it is intended to prepare the varnish, and is placed upon an ordinary chafing-dish charged with incandescent fuel, which heats the amber to such a temperature as to cause it to become incorporated with the oil. When this is completely effected, the vessel is cleansed for a fresh operation, and the other ingredients necessary for the manufacture of the varnish are added to the mixture of oil and amber, as soon as it has cooled down to a suitable temperature.

These very simple means present the following important advantages over those now in use for the manufacture of varnishes:

1st. The amber melts completely without any residuum; and as it is contained in a perfectly tight vessel, nothing, or next to nothing, is lost by the evaporation of its constituent parts.

2d. The application of a high temperature effects the fusion with ease and rapidity.

3d. This mode of preparing varnishes is perfectly free from danger as regards fire. The amber is contained in a perfectly close vessel, and cannot, therefore, take fire, espe-

cially as the air has no access through the spout through which the melted amber flows. Neither will the oil through which the melted amber flows be liable to take fire, for it does not require to be heated to a very high temperature, as is at present the practice,—the amber being now melted and dissolved in oil heated to the point of violent ebullition. And further, the chafing dish is small, and it is impossible it can communicate to the vessel filled with oil (which is of much more considerable capacity) sufficient heat to cause fear of fire.

4th. All the vessels are of stout copper, and consequently are not liable to burst, as is the case with the earthen ones, which are at present too often employed.

It will thus be seen, that, independently of the practical advantages which this method of manufacturing varnish (and which has already stood the test of long experience) possesses over those ordinarily in use, it has the important one of being unattended with danger.—*Pharm. Journ., Sept., 1849, from the Technologiste, as translated in the London Journal.*

ART. XV.—MODE OF SILVERING GLASS BY THE EMPLOYMENT OF GUN-COTTON.

M. Vohl has recently discovered that a solution of gun-cotton in a caustic ley possesses in a high degree the property of precipitating silver from its solutions in the metallic form. In fact, on bringing gun-cotton into contact with a caustic ley of sufficient strength, the cotton will become dissolved in the ley, giving out ammonia with a considerable degree of heat, and producing a deep brown liquid, somewhat thick. On pouring an acid into this, a brisk effervescence is produced, carbonic acid and nitrous acid being disengaged.

The action of the gun-cotton in this instance shows that it is not simply dissolved, but undergoes decomposition, by which the atoms of oxygen in the nitric acid enter into combination with the atoms of carbon in the cotton, thus producing carbonic acid, which, as well as the nitrous acid produced by the nitric acid, combines with one part of potash. A fresh decomposition of nitrous salt by the potash, in the presence of hydrogenated substances, furnishes ammonia.

The most remarkable property of this alkaline solution is the following: On pouring into it a few drops of a solution of nitrate of silver, and adding ammonia until the oxide of silver formed is re-dissolved (the mixture being slowly heated in a water-bath,) the liquid will at a certain period assume a deep-brown color and effervesce, the whole of the silver being precipitated on the sides of the vessel. The mirror thus produced is much superior in brilliancy to those produced by means of ethereal oils or ammoniacal aldehyde; and the facility with which it is produced will doubtless render it of practical importance.

This property is not exclusively possessed by gun-cotton; it is found also in cane-sugar, sugar of milk, manna, gums, and other substances which may be rendered explosive by treating them with nitric acid. Nitropicric acid produces under the same circumstances a reflecting metallic surface; and it appears that this reaction takes place with all bodies which, when treated with nitric acid, do not furnish products of oxidation, but another series of bodies, which admit of carbonic acid forming one of their constituent parts.—*Pharmaceutical Journal, from Technologiste, and Newton's Journal.*

ART. XVI.—ON SENNA LEAVES.

BY F. L. BLEY AND F. DIESEL.

Messrs. Bley and Diesel have submitted *Senna obovata*, *S. Alexandrina* and *S. Tinnevelly*, to chemical examination, and obtained the following results: Volatile oil and malic acid could not be discovered in the senna. The leaves of *Cassia lanceolata* and of *C. obovata* left 11 or 12 per cent. of alkaline ashes, in which chloride of potassium, traces of lime, magnesia, and soda, were found mostly combined with carbonic acid, and also phosphoric and silicic acids. Senna leaves also contain a peculiar *yellow resin*, probably the same which Feneulle obtained in the impure state from senna-pods. Messrs. Bley and Diesel call it *Chrysoretin*. The *brown resin* and the *brown extractive matter*, which was called by Lassaigne and Feneulle *Cathartin*, cannot be completely separated from each other. *Pectin*, *gummy extractive matter*, *chlorophylle*, and a small quantity of *fat*, were also found.

Although the authors were not able to isolate the active principle, yet they are of opinion that Alexandrian senna is more active than either the obovate or Tinnevelly senna, because it yields a larger quantity of a spirituous extract, having a superior odor and taste. This property is used as a measure, for spirit of wine also dissolves almost all the constituents which water takes up from the leaves. At the same time, it is observed as a striking circumstance, that the alcoholic extract of half an ounce of senna (which had been perfectly exhausted by spirit of wine) produced only nausea and uneasiness, and could therefore contain but little of the active principle. As regards experiments concerning the efficacy of the individual constituents of senna, we have the following results:—the *chrysoretin*, in doses of from 30 to 45 grs., remained without effect; the *brown resin*, in doses of from 15 to 80 grs., did not operate upon

the bowels, but merely caused nausea, and in larger doses, vomiting. In large doses of 60 grs., it appeared to operate as a diuretic, and could be detected after a short time in the urine, in consequence of the color which it assumes on the addition of potash. The so-called *cathartin*, in doses of two-and-a-half to three drachms, caused only nausea and disagreeable eructation, without operating upon the bowels.

These experiments tend to show, that the individual constituents, extracted by spirit of wine from the senna leaves, as well as their aggregate, do not purge. The authors, however, doubt the statement of Heerlein, that spirit of wine only extracts from the leaves macerated in it inert substances, and none of the active principle. The final result to which they are led by their examinations is, that odor, taste, relation to chemical agents, and medicinal powers of senna, depend chiefly on the co-operation of the extractive matter and the resin, and only in a subordinate degree on the pectin, the pectates, and the other salts of the leaves. No share in the activity can be ascribed to the volatile oil, as no appreciable quantity of it can be procured.—*Pharmaceutical Journal, from Pharm. Central Blatt. für* 1849, *No.* 8.

ART. XVII.—ON OIL OF COPAIVA.

By C. C. Mitscherlich.

Mitscherlich has made a number of experiments with the oil of copaiva, and found that the effects of it are similar to, but much milder than, those of the oil of lemon and turpentine. Oil of copaiva is, of all the volatile oils yet examined, the feeblest poison, for though from six drachms to one ounce of it introduced into the stomach of rabbits caused in full-grown rabbits considerable illness it did not produce death. Young animals died within from 11 to 28 hours from one ounce.

The oil of copaiva is absorbed from the stomach. Immediately after death has taken place, it can be detected by the odor in the abdomen, but not in the blood. The urine acquires a strong odor of the oil. The experiments on the odor of the breath cannot be relied on, as, by the introduction of the oil through the mouth, the latter is easily soiled by it, and then acquires the smell of the oil.

The volatile oil of copaiva, moreover, causes a similar change in the organism to that produced by the oils of lemon and turpentine, and juniper. The stomach is neither inflamed nor reddened; in one case small blood discs were perceived in it, in another instance the innermost layer of the glandular coat was softened. The small intestine is so far changed, that its epithelium was removed and converted into mucus. The large intestine was, in one instance, where the oil did not reach it, perfectly normal. In another case, where the oil had reached it, no epithelium was perceived, and one spot was inflamed.

The chief symptoms in cases of poisoning with oil of copaiva are, frequent but not very powerful pulsation of the heart; greatly accelerated respiration; frequent emission of urine, mostly in small quantities; frequent excretions of fæces, which are at first shaped, but afterwards pasty, and at last mucous and mixed with blood. Muscular weakness increases; in most cases a diminished sensibility, slow respiration, frequent and very feeble pulsation of the heart, lying on the side, and death without convulsions. It appears that death was produced by the passage of the oil into the blood, and not from the bowels.

Upon the skin of man the effect of the oil of copaiva is much weaker than that of the oils of lemon and turpentine, and weaker than that of the oil of juniper. In one case, where a spot on the back of the hand was moistened for an hour with the oil, no burning was experienced; in another case a very slight burning was felt only at last.

The oils of lemon, turpentine, juniper, and copaiva, agree

in their per-centage composition; the equivalents of carbon and hydrogen being in each as five to four. They greatly resemble one another in their pharmacological effects, but differ materially from the other volatile oils, which have a different composition.

The volatile oil of mustard, caraway, fennel, cinnamon, nutmeg, and bitter almonds, in large doses, excite the vascular system and the respiratory organs. They produce diarrhœa, increase more or less the secretion of urine, and cause death with very similar symptoms.

The volatile oil of savine differs from the foregoing in being a much stronger poison, causing no diarrhœa, and acting more violently on the kidneys.—*Pharmaceutical Journal, November* 1849.

ART. XVIII.—ON THE PRODUCTS OF DISTILLATION OF LACTIC ACID AND OF THE LACTATE OF COPPER.

By M. Engelhardt.

When a highly concentrated lactic acid is exposed to a temperature of 266° to 284° F., an aqueous, acid, and somewhat empyreumatic liquid distils over very slowly. It is dilute lactic acid. When this temperature has been maintained for a considerable time until no more water passes over, the brownish yellow residue forms the anhydrous lactic acid of Pelouze, $C^{12} H^{10} O^{10}$. If the boiling is facilitated by rough substances, &c., the hydrated lactic acid can be brought into a state of ebullition at 392°, and be distilled without decomposition; but, without this assistance, whilst a portion passes over which increases in amount according to the height of the temperature, the remainder is converted between 356° and 392° into anhydrous acid.

Anhydrous lactic acid dissolves but very sparingly in boiling water, to which it imparts a bitter taste. In the state in which it occurs forming the residue in the retort,

it is a solid, amorphous, brownish yellow mass, which melts even below the boiling point of water, becomes tenacious on cooling so as to be drawn into threads, possesses an excessively bitter taste, and dissolves in every proportion in spirit and in absolute alcohol. From this solution the anhydrous acid is precipitated by water in flakes, which gradually unite into drops. By prolonged boiling with water, or by long standing exposed to a moist atmosphere, the anhydrous acid is reconverted into the ordinary state. This metamorphosis is very quickly effected by treatment with alkalies and alkaline earths. The anhydrous lactic acid may be exposed to a temperature of 464° F. without experiencing any change; decomposition begins at 482° and is complete at 500°. The products of decomposition (at 500°) are carbonic oxide, with about 3 to 4 per cent. in volume of carbonic acid; further, aldehyde, lactic and citraconic acid, with which is mixed some reproduced lactic acid; no hydrocarbons were found among them, nor could any lactone or acetone, stated by Pelouze to occur among these products, be detected. From 1 to 2 per cent. of carbon remained in the retort.

When, in order to separate these substances, the distillate is mixed with water, aldehyde and hydrated lactic acid dissolve, whilst another portion sinks to the bottom as a transparent, yellowish, and at first very mobile oil. When left for some time in contact with water, the amount of the oil gradually decreases, and in the course of a few days it has entirely disappeared, leaving behind a few smeary crystals, which likewise dissolve in the course of time. This results more rapidly when a large quantity of water is added, and the whole well shaken or heated. The oil consists of lactide, citraconic acid, and some hydrated lactic acid. That no anhydrous lactic acid distils over as such is proved from the fact, that when the contents of the first recipient are allowed to solidify, and are then treated with alcohol, which leaves the lactide undisssolved, no lactic acid is precipitated by water from the alcoholic solution.

Aldehyde.—When the distillate, either in the state of liquid or as a crystalline paste, is heated in a water bath to 212°, and the new product passed into anhydrous æther kept cold, this subsequently yields, on passing ammonia through it, aldehyde ammonia.

Lactide.—The residue from the preceding treatment, from which the aldehyde has been removed, forms a brownish liquid, which in most cases again solidifies to a crystalline paste, which is thrown upon a filter, washed with cold absolute alcohol, and dried by pressure between bibulous paper. In order to obtain large crystals, it is redissolved in a little boiling absolute alcohol and set aside to cool. What does not crystallize on cooling is lost, from its becoming converted, both by spontaneous evaporation and by heat, into ordinary lactic acid. The crystals appear to belong to the rhombic system, and exhibit great resemblance to those of the protosulphate of iron. Lactide cakes somewhat together at 248°, and can be sublimed, but it proceeds very slowly. At a higher temperature it melts, sublimes more quickly, and furnishes at 500° the same products of decomposition as the anhydrous lactic acid. Lactide also behaves exactly like anhydrous lactic acid towards water, alkalies and alkaline earths. It is reconverted into hydrated acid. It is, however, more soluble in boiling water than the anhydrous lactic acid, and again separates for the greater part on cooling in small needles. It has neither smell nor taste, but very soon acquires, with the assimilation of water, a strongly acid taste. Lactide, dried *in vacuo*, furnished on analysis—

Carbon, . .	49·87	6	50·00
Hydrogen, .	5·67	4	5·56
Oxygen, .	44·46	4	44·44

Citraconic Acid is produced only in small quantity. The alcohol with which the crystals of lactide were washed, contains this acid and also lactic acid; it is filtered and dis-

tilled ; what passes over at 428° is saturated with carbonate of baryta, when the salt, which is perfectly insoluble in alcohol, falls as a crystalline paste. This is dissolved in boiling water, from which solution the citraconate of baryta separates on cooling in beautiful nacreous laminæ, which are obtained of the largest size when the solution is concentrated until a pellicle forms on the surface. The air-dried salt lost at 212°, 14·82, 14·49, 14·93 and 14·29 per cent, or 5 atoms of water. The salt, dried at 212°, furnished—

Carbon, . .	22·57	22·80	10	22·61
Hydrogen, .	1·81	1·93	4	1·51
Oxygen, . .	18·15	17·40	6	18·09
Baryta, . .	57·47	57·87	2	57·79

Lactic Acid.—This is left, either in the anhydrous or hydrated state, in the retort, in the preceding distillation of citraconic acid.

In one experiment, in which 19·5 grms. of anhydrous lactic acid were exposed to a temperature of 500°, and which was continued for eight hours, the author obtained 12·2 per cent. aldehyde, 14·9 lactide, and 1 per cent. carbon. Several experiments made at the same temperature furnished approximative results. On raising the temperature above 500°, for instance to 572° and higher, the amount of lactide and lactic acid is diminished and that of the aldehyde increased. As the disengagement of gas is far more violent, the gases must be much more carefully cooled, in order to prove directly the increase of the aldehyde. The lactide formed is for the greater part decomposed into aldehyde and carbonic oxide by this temperature, which is much above that of the point of sublimation. The decomposition of the lactic acid is therefore simply as follows: At first lactide is produced, and this is decomposed at a higher temperature into 2 equivs. carbonic oxide and 1 equiv. aldehyde, $C^4 H^4 O^2 + 2CO = C^6 H^4 O^4$. The presence of carbonic acid and the composition of citraconic acid tend to

show that in the distillation there is also a substance containing more hydrogen formed; it was, however, found impossible to isolate it.

Lactate of Copper exhibits two stages of decomposition on destructive distillation. In the first period, which is between 392° and 410° F., carbonic acid and aldehyde appear, with a little hydrated lactic acid, the latter probably arising from the crystals retaining some water of crystallization. The retort now contains metallic copper and anhydrous lactic acid, the decomposition of which between 482° and 500° forms the second period. Lactates with strong bases are decomposed in a different manner. The author recommends the dry distillation of lactates with weak bases for the preparation of aldehyde.—*Chemical Gazette, Sept.* 15, 1849, *from Liebig's Annalen*, lxx. p. 241.

ART. XIX.—ON THE ACTION OF CHLOROFORM ON THE SENSITIVE PLANT (MIMOSA PUDICA.)

By Professor Marcet of Geneva.

When one or two drops of pure chloroform are placed on the top of the common petiole of a leaf of the sensitive plant, this petiole is seen almost immediately to droop, and an instant after the folioles close successively pair by pair, beginning with those which are situated at the extremity of each branch.* At the end of one or two minutes, sometimes more, according as the plant is more or less sensitive, most of the leaves next to the chloroformed leaf and situated beneath it on the same stalk, droop one after another, and their folioles contract, although generally in a less com-

* I previously convinced myself by experiment that a drop of water, placed delicately on a leaf of the sensitive plant, caused no movement.

plete manner than those of the leaf placed in immediate contact with the chloroform. After a rather long time, varying according to the vigor of the plant, the leaves open again by degrees; but on trying to irritate them by the touch, it is seen that they have become nearly insensible to this kind of excitement, and no longer close as before. They thus remain as torpid for some time, and generally do not recover their primitive sensitiveness till after some hours. If, however, when they are in this state of apparent torpidity, they are subjected again to the action of the chloroform, they close again as they did the first time. It is not till after they have been chloroformed several times, that they lose all kind of sensitiveness, at least until the next day; sometimes they even fade completely at the end of too frequent repetitions of the experiment. In all cases the effects observed are the more marked in proportion to the purity of the chloroform employed and the degree of sensitiveness in the plant.

An anologous phenomenon is produced if, instead of placing the drop of chloroform on the base of the petiole, it is laid on the folioles situated at the extremity of a branch, the folioles of this branch immediately begin to close pair by pair, the common petiole droops, lastly the folioles of the other branches close in turn. At the end of two or three minutes, the nearest opposite leaf, and if the plant is vigorous, most of the other leaves situated below on the same stalk, follow their example. When, after some time, the leaves open again, the same want of sensitiveness is manifested as in the preceding case.

A singular feature in this phenomenon is the manner in which the action of the chloroform is propagated from one branch to another, then from one leaf to another, even the liquid disappears by evaporation almost as soon as it is deposited. This action, as we have just seen, appears to be communicated from the leaf to the stalk, following in the latter a descending direction; generally the leaves situated

above the chloroformed leaf are not at all effected. DeCandolle, in making an analogous experiment on a sensitive plant with a drop of nitric or sulphuric acid, remarked on the contrary, that it was the leaves above the leaf touched which closed, without those situated beneath participating in this motion. The observation of our learned countryman is quite naturally explained by attributing to the ascending sap the transport of the corrosive poison, a transport which, in this case, would take place in the direction from below upwards. But how to account for the apparent transmission of the effects of the chloroform in the contrary direction, from above downwards? Might the descending sap more peculiarly have the property of transmitting the narcotic effects of this singular compound from one part of the sensitive plant to the other; or might there exist in this plant some special organ susceptible of being affected by certain vegetable poisons in a manner analogous to the nervous system of animals? Notwithstanding the interesting investigations of Dutrochet and other physiologists, there still prevails too much obscurity on this subject to hazard an opinion. But in any case the fact is singular, and appears to me to merit the attention of persons accustomed to engage in questions of this nature.

Experiments of the same kind, made on the contractility of the sensitive plant with rectified ether, have furnished me results nearly similar to the preceding; with this difference, however, that whilst one drop of chloroform placed on the common petiole of a leaf situated at the extremity of a branch of a sensitive plant suffices to cause most of the other leaves situated beneath on the same branch to close, ether in general produces an effect only on the leaf itself with which it is put in contact. The next leaves have generally appeared to me not effected. I must however add, that my experiments with ether having been made after others, and at a time of year when the sensitiveness of

the plant had already begun to diminish, it is possible that the intensity of the effects produced may have thereby been effected.—*Silliman's Journal from Phil. Mag.*

ART. XX.—EMPLOYMENT OF CASEIN AS AN ENVELOPE FOR MEDICINES.

By G. Jozeau.

In order to disguise the disagreeable odor and flavor of pills, and to increase their durability, M. Joseau recommends their being coated with casein instead of with gelatin.

Take fresh casein free from butter, put it for twenty minutes into boiling water, press it strongly, and then dissolve it in a sufficient quantity of solution of ammonia, so as to form a liquid having the consistence of syrup ; then mix it with sugar (about one-tenth of the weight of the casein,) evaporate the whole to dryness, and rub to powder

In order now to envelop pills with it, a small quantity of the powder is to be dissolved in water, so as to form a thick mucilage, with which the pills are to be moistened. They are then to be covered with the powder. The pills must be coated two or three times, according to the intensity of their odor and flavor. After the last coating of mucilage, they are to be dipped into slightly acidulated water, instead of being covered with powder, and are then to be dried.—*Pharmaceutical Journal, Dec.*, 1849.

ART. XXI.—ON THE PRODUCTION OF MANNA.

By Mr. J. Stettner.

The *Manna ash, Fraxinus onus*, in the manna districts of Capace, Cinesi, and Fabarotto, where the best manna is obtained, does not form woods, as is commonly supposed, but is cultivated in separate plantations. These plantations generally present regular squares, hedged in with *Cactus opuntia*. The trees are planted in rows, and are from two to eight inches in diameter, with stems from ten to twenty-five feet high, which from the first shoot are kept smooth and clean. The soil is carefully loosened and freed from weeds. After the eighth year, the trees yield manna, which they continue to do from ten to twelve years, when they are cut down, and young shoots from the roots trained; one root-stalk frequently yields from six to eight new trees and more. For the production of the manna, young and strong shoots are requisite; but they are not tapped till the tree ceases to push forth any more leaves, and the sap consequently collects in the stem. This period is recognized by the cultivators from the appearance of the leaves; sometimes it occurs earlier than at others, and the collection of the manna takes place either at the beginning of July or only in August. Close to the soil cross sections are made in the stem, and in the lowermost sections small leaves are inserted, which conduct the sap into a receptacle formed by a cactus leaf. This is the way the manna *in sortie* is obtained. The incisions are repeated daily in dry weather, and the longer they continue the more manna is obtained. The stems are left uninjured on one side, so that the manna runs down the smooth bark more easily. The next year the uninjured side is cut. The *Manna cannelata* is obtained from the upper incisions, more than forty of which may be counted on one tree. The sap there is not so fat as below, and consequently dries more easily into tubes and

flat pieces. After the manna has been removed from the trees, it has further to be dried upon shelves before being packed in cases. The masses left adhering to the stems after removing the inserted leaves, are scraped off, and constitute the *Manna cannelata in fragmentis. Cannelata, can. in fragm.* and *Capace* are collected at the same time from one stem—the more *Cannelata* from the younger, and the more *Capace* or *Gerace* from the older part of the stem. In Sicily, the latter is designated *in sortie*, and is probably the most active. Dry and warm weather is essentially requisite for a good harvest.—*Pharm. Journ. for Dec., from Hooker's Journal of Botany.*

ART. XXII.—OBSERVATIONS ON THE BUTTER OF ANTIMONY.

By A. Larocque.

Serullas has shown, in his treatise on the pharmaceutical preparations of antimony, that all these preparations contain arsenic, excepting tartar-emetic and the protochloride of antimony. It must therefore be interesting to pharmaceutists to learn how it is that these two combinations are obtained free from arsenic. The author first followed the directions of the French Codex for the preparation of the butter of antimony.

To prepare this compound, sulphuret of antimony containing sulphuret of arsenic is usually employed. As soon as this is treated at a gentle heat with an excess of muriatic acid, sulphuretted hydrogen escapes, and a solution is obtained in which protochloride of antimony and a small quantity of sulphuret of arsenic are contained. This solution furnishes, on evaporation and distillation, the butter of antimony. In this distillation we first observe that muriatic acid with very little protochloride of antimony pass over; as soon as the temperature rises, the retort becomes coated

with an orange-colored precipitate, whilst as yet but little butter of antimony passes over. Soon after this the concussions which previously occurred cease, and the yellow deposit no longer increases. The distillation of the protochloride of antimony now proceeds without further hinder ance.

We observe therefore in the preparation of the butter of antimony two phases. During the first, muriatic acid passes over, and as this disappears the sulphuret of arsenic held in solution in the protochloride of antimony by the excess of muriatic acid separates. The distillation of the butter of antimony really takes place only during the second period. When therefore the receiver is changed at the proper time, the preparation is obtained perfectly free from arsenic.

It results from this behavior, that with butter of antimony prepared in the above manner, powder of Algaroth may be obtained perfectly free from arsenic, which is not the case when the chloride of antimony used for this purpose is prepared by treating sulphuret of antimony with nitric acid, and dissolving the oxide produced in muriatic acid.—*Chem. Gaz. Nov. 1st., from Journ de Pharm.*

ART. XXIII.—VEGETABLE INFUSIONS.

M. Donovan says, that infusions of angustura, orange-peel, cloves, cascarilla, catechu, colomba, gentian, quassia, rhubarb, senna, simarouba, valerian, and perhaps others, may be easily made to assume the concentrated form. If these infusions be directed to be prepared four times the strength of those at present in use, then one part mixed with three of water, will give the article required. The liquor of which the infusions are to be made should be a mixture of three parts of water with one spirit of wine. An infusion made in this way will remain unchanged for any

required time, at least a year, and perhaps many years. If an ounce of such an infusion be mixed with three of water, each tablespoonful will contain one-quarter of a drachm of spirit which could not do injury, even though repeated every two hours. It will, perhaps, answer the purpose better to make use of the mixture of spirit and water, for infusing the materials, than to use mere water, and afterwards to add spirit. In the latter method a precipitation of gelatinous flakes, sometimes considerable in quantity, takes place, which very slowly subsides, and constitutes no small portion of the total bulk. In the former method, this inconvenience is in a great measure avoided, although there is a trifling loss of spirit. The residuum in each case should be submitted to the screw press. Such concentrated infusions would in all probability become articles of manufacture with the large druggists and manufacturing chemists; and thus would the apothecary be relieved of a vast deal of unavailing trouble.—*Amer. Journ. Med. Sciences, from Dublin Medical Press, December* 20, 1848.

ART. XXIV.—PATENT GRANTED TO JAMES CASTLEY FOR IMPROVEMENTS IN THE MANUFACTURE OF VARNISHES FROM RESINOUS SUBSTANCES.

The first part of this invention consists in manufacturing a strongly adhesive and perfectly water-repellent varnish from resin spirit and gutta percha.

3 parts by weight of the gutta percha of commerce are put into a pot with 9 parts of crude resin spirit (obtained by the destructive distillation of common resin,) and subjected to a heat of from 120° to 140° F., the mixture being stirred occasionally until the gutta percha is dissolved. The varnish thus produced is suitable for coating coarse fabrics, such as tarpaulins, rick-cloths, &c.: but to obtain a varnish suitable for fine aricles, the patentee substitutes for

the crude resin spirit above-mentioned a rectified resin spirit, obtained by passing a current of steam through the crude resin spirit until the condensed product which comes over attains a specific gravity of about 0·870; at which point the process of distillation must be stopped, as all products of a higher specific gravity will be injurious to the quality of the spirit.

The second part of this invention consists in manufacturing a colorless varnish from resin spirit and gum damar, or from resin spirit and gum mastic.

The patentee mixes resin spirit, which has been rectified by steam in the manner above described, with from one-tenth to one-sixth of its weight of sulphuric acid of not less than 1·700 spec. grav., and thoroughly agitates the mixture; then he rectifies the spirit again by a current of steam, when the spirit comes over in a colorless state; after which he dissolves the gum damar or gum mastic in about four times its weight of this purified rectified spirit, with the aid of a gentle heat. An inferior varnish may be obtained by using resin spirit which has undergone only one process of rectification and has not been treated with sulphuric acid. —*Chemical Gazette, October*, 1849.

ART. XXV.—ON THE NON-EXISTENCE OF CROTONINE.

By F. Weppen.

According to Brandes' directions for the preparation of crotonine, an alcoholic extract is prepared of croton seeds, the greater portion of the alcohol removed by distillation, and the residue boiled with water and magnesia. The precipitate is then exhausted with alcohol, from which, after filtration, the crotonine crystallizes on evaporation.

The crystals so obtained have, it is true, an alkaline

reaction, but cannot be burned completely upon platinum foil and do not neutralize acids. When they are digested with dilute sulphuric acid, a layer of oil separates on the surface, which after sufficient washing dissolves readily in hot alcohol, and communicates to the solution an acid reaction. On cooling, the substance separates from the alcohol partially in a butyraceous state. It dissolves readily in carbonate of soda, and furnishes a soap. The supposed crotonine is consequently nothing more than a magnesia soap with an alkaline reaction.— *Chemical Gazette, Sept.* 15, 1849, *from Liebig's Annalen*, lxx. p. 255.

ART. XXII.—ON A MODE OF RENDERING SUBSTANCES INCOMBUSTIBLE.

By Robert Angus Smith.

I have often been surprised that, considering the number of materials which will not burn and the small number which do burn, we should be compelled to build houses so liable without constant watchfulness to instantaneous destruction; that we should go also to sea in vessels made of a most combustible substance filled with enormous fires, frequently under the care of ignorant men. I think, therefore, I may be excused when I endeavor to add to a knowledge of the mode of rendering substances incombustible, or the theory of the mode to be sought after, even if the addition which I make be but a very small one.

Silicate of potash has been considered good. It is a soluble glass which was expected to cover the fibre of cloth or wood, and so protect it from heat. This does act to some extent, probably in the same manner as stones do when put into a fire of wood or coal; they take heat but give none, and are also bad conductors. If silicate of potash remained as a glass, it would act also by keeping out the

air; but this does not seem to be the case, as it falls after a time to a powder.

It struck me that the mode of preventing combustion was not by protecting the wood from the fire merely, as heat must cause combustible gases to rise from wood, whether there be incombustible substances mixed with it or not, and these gases will force their way to the surface where there is no longer any preventive to burning. My object then was to find a substance which would render the wood unfit to burn, and would cause it to give out gases which would not burn; so that whilst the wood itself was being preserved, except where in contact with the fire, the gases would assist in extinguishing the fire.

I first tried phosphate of magnesia and ammonia, thinking the ammonia given out would be of use in extinguishing the fire; but this was of no value, as a piece of calico required to be made quite stiff with it before it was rendered incombustible. The calico was prepared by dipping it in a solution of phosphate of magnesia in muriatic acid and then in ammonia. It seemed to me that the earthly salts are of little use for the purpose required, and that the amount of solid matter incapable of evaporation left on the cloth, assists in a very small degree.

Sulphuric acid, however, seemed to present the most promising characteristics of a substance incapable of burning, and of acting so strongly on vegetable substances as to make them incapable of burning. Sulphuric acid itself is a body perfectly burnt, or we may say overburnt, having an atom of oxygen given to it by artificial means, so to speak, which atom is difficult to separate, and therefore not resembling the oxygen of many highly oxydized bodies. It requires a high degree of heat to raise it to vapor; and the vapor formed is sluggish and heavy, remaining long where formed, and quenching flame wherever it is. It destroys the texture of wood also and other vegetable substances, causing them to give out after a time gases which do not

burn, mixed with some which do burn; but if there be enough of acid, forming a mixture which does not burn. The wood also cannot be again induced to become combustible until it be heated to redness, so as to remove all the sulphuric acid, leaving only charcoal.

If sulphuric acid then could be introduced into wood just at the time that the fire was going to take place, the fire would cease to take place; and this we can do easily by saturating the wood with sulphate of ammonia. When there is no fire present there is no sulphuric acid present, as such; but as soon as the heat rises, ammonia goes off, and sulphuric acid is instantly presented to the wood. The ammonia does not come off quite pure, it is mixed with nitrogen and sulphurous acid; and this disengagement of gases is of advantage in extinguishing fire; when the heat rises to 536°, the sulphuric acid is then left to act on the wood in part and to volatilize in part, and that which I have mentioned takes place. The outside of course would first undergo the change, and the inside would be protected by the incombustible outer part; if the fire continued to act long, the inner layer would undergo a similar change. I imagine, then, the acid acts in a double manner; it makes the wood refuse to burn, and it puts out fire. As sulphurous acid is given off in this process, the action is also similar in one point of view to that of sulphur, which has long been used for putting out fire in chimneys.

I have no doubt that a house of wood prepared in this manner might have a fire lighted on the wooden floor without danger, burning only on the spot to which the fire was limited. A ship also would be safe, even if the cinders did fall from the grate in stormy weather.

I know that muriate of ammonia has been used, and that it acts very well; but I think the sulphuric acid is superior, the ammonia being merely to keep it innocent; and other volatile base might do. I am sorry, however, that this is not perfect; its solubility in water is a great disadvantage,

as it cannot be applied to cloths to be frequently washed. True, it is so cheap that it might be applied every washing where there are peculiar dangers; but if a person was standing very near the fire, the ammonia would in part be evaporated, and the acid remaining would be enough to injure the fabric. There are, however cases, such as curtains, to which this could not apply, and where it would be valuable.

Sir William Burnet's liquid is chloride of zinc: he uses it for preserving wood and canvass, and also for preventing fire. I am certainly surprised that more use has not been made of it, being as far as I have seen it, so efficient. I believe the manner in which the chloride of zinc acts is very similar to that of sulphuric acid, destroying the organic matter on the approach of heat, and rendering it incombustible. It can be introduced into wood at a specific gravity of 2000, I believe; sulphate of ammonia cannot easily be used above 1200. By heating the solution more may be attained. Sulphate of ammonia is cheap and easily procured and used, not hurting anything with which it may come in contact, and therefore more easily managed in households.

The chloride of zinc is said to unite with the fibre. This cannot be said for the sulphate of ammonia. It would not, however, come from the centre of a beam of wood, even if immersed in water, as the water enters with great difficulty into wood; and the solution itself cannot be introduced without forming a vacuum in the saturated vessel, and so removing all the air from the wood.

The first time I used this solution I found a large quantity of mould formed, and indeed it contains all the elements to increase its growth. The second time the solution was boiled in an iron vessel, and no mould formed on it; on the contrary mould was destroyed by it. The sulphate of ammonia dissolves iron rapidly, and formes a double salt which is deleterious to such growths. I imagined any

other metallic salt would do, and used ordinary chloride of manganese prepared in the laboratory, which killed all such fungi rapidly, and no more have grown after standing eleven months in contact with organic matter.

I believe there are many ways in which this may be used. My wish was to find a substance suited for building fire-proof ships, and I believe this would do; at any rate the ships would be fire-proof, experience could alone tell if any other objection followed. It does not render the wood hard, heavy or brittle.

I believe it would be of the greatest advantage in mills, which now suffer so much from fire, diminishing or rather entirely removing the expense of insurance. It does not hurt colors; so that even colored goods might be dipped when kept long in one place, or when sent in vessels abroad. Possibly some delicate colors may be attacked, but this must be a rare case.

I am more desirous of seeing ships built of an incombustible material, the means of escape at sea being few, and confined to few; and whilst there is any hope of doing it easily, I scarcely think it proper for any one to neglect what information may exist on the subject.—*Silliman's Journal from Phil. Mag.*

ART. XXVII.—ON ATROPINE.

By Drs. Bouchardat and Stuart Cooper.

The authors recommended the substitution of atropine for belladona, in order to obviate the uncertainty of the operation of the latter. The dose can be increased from two milligrammes to one centigramme [about $\frac{3}{100}$ths to $\frac{15}{100}$ths of a grain troy.]

The local pain caused by atropine when endermically applied is only of short duration, and is not accompanied by any bad consequences. Internally, atropine may be given in the following forms:—

1. *Tinctura atropini.*—1 gramme of atropine dissolved in 100 grammes of spirit of wine of 85 per cent.; one drop of this solution contains about half a milligramme of atropine. The dose is ten drops.

2. *Syrupus atropini.*—One decigramme of atropine dissolved in ten grammes of water, acidulated with one drop of muriatic acid, and mixed with 100 grammes of simple syrup. In 100 grammes of this syrup is contained one centigramme of atropine. The dose is twenty grammes.

3. *Pulvis atropini.*—One centigramme of atropine mixed with two grammes of sugar, and divided into twenty equal parts. Each powder contains half a milligramme of atropine. Children of five years old may take it in hooping-cough two or three such powders daily.

4. *Pilulæ atropini.*—Five centigrammes of atropine, mixed with pulv. rad. althææ and a small quantity of honey, may be made into fifty pills, and one or two given for a dose.

5. *Collyrium atropini.*—One decigramme of atropine dissolved in 100 grammes of distilled water. *Collyrium atropini fortius* is prepared with five centigrammes of atropine and twenty grammes of distilled water. For dilat-

ing the pupil, one or two drops are to be introduced into the eye.

Bouchardat recommends the following method of preparing atropine. The atropine is to be precipitated by a watery solution of iodine in iodide of potassium, and the iodurettted hydriodate of atropine decomposed by zinc and water. The metallic oxide is separated by means of carbonate of potash, and the alkaloid dissolved in alcohol.

Rabbits are scarcely affected by atropine. Dogs are soon poisoned by it. On man the effect is much stronger. One centigramme is able to produce the following symptoms: At first, acceleration of the pulse by eight to twenty strokes; after thirty to fifty minutes, an affection of the brain is produced. The first and most constant symptom is dry throat, with difficulty of swallowing. The second is dilatation of pupils, with increased power of vision, also giddiness, noise in the ears, hallucination, delirium, stranguary, with incapacity of emitting the urine; a sensation of formication in the arms, rigidity of the thighs, depression of the pulse. The unfavorable symptoms disappear after twelve to twenty hours. The sanatory effect of the atropine has chiefly been substantiated in chorea and other chronic nervous diseases.—*Pharmaceuticcl Journal for November.*

MINUTES OF THE PHILADELPHIA COLLEGE OF PHARMACY.

At an Adjourned Meeting of the Philadelphia College of Pharmacy, held 11th month 5th, 1849. Present 21 members.

Daniel B. Smith, President, in the Chair.

The objects of the meeting having been stated, the minutes which refer to them were read.

The Committee to whom was referred the proposition to alter Section 2d of Law 5th of the By-Laws of the College, respectfully report the following amendment of the proposition referred to them, viz., To substitute for Section 2d of Law 5th, the following:

Sec. 2. Any Graduate of Pharmacy, producing [the diploma of a respectable College of Pharmacy, and conforming in his professional conduct to the Code of Ethics adopted by this College, may be elected a Resident Member by the Board of Trustees, in the manner prescribed by the By-Laws of that Board.

Any applicant for Resident Membership, conforming to the Code of Ethics adopted by this College, who has served a regular apprenticeship to the drug and apothecary business, but is not a graduate of Pharmacy, shall be examined in reference to his professional qualifications by a committee of examination to be appointed annually by the Board of Trustees, and if his examination is satisfactory, he shall in like manner be eligible to election by the Board.

Also, to substitute for Section 4th of Law 5th, as follows:

Sec. 4th. Professional or scientific men, residing at a distance from Philadelphia, may be elected Associate Members, by the Board of Trustees, provided they are graduates of a respectable College of Pharmacy. Those who are not graduates of Pharmacy, if recommended by the Board as suitable condidates, may be elected Associate Members by the College, at any of its meetings, by the unanimous vote

of the members present. Each member, so elected, to pay a contribution of twenty dollars, in lieu of all other contributions.

We recommend the adoption of these alterations on the ground that their enactment would prevent the admission of unqualified persons into membership in the College, which, under the present rules, that designate no method of ascertaining the professional qualifications of applicants, might at times occur, and which should be avoided as well for the credit of the Institution, as in justice to its qualified members and graduates.

The Certificate of Membership is, in fact, a Diploma, certifying to the confidence of the College in the professional knowledge and skill of those to whom it is granted, and it is often a question with members, whether they can honestly vote to bestow it upon applicants, of whose fitness to receive it they have no means of judging.

Your Committee know no better means of ascertaining the professional qualifications of applicants for Resident Membership, than is designated in the amended section now recommended for adoption, and believe that few qualified persons, desiring to become members, would object to a preliminary examination on these points before a committee; while the knowledge that no members, not graduates, were admitted who had not passed such examination, would add to the value of a membership in the College, as well as tend to increase the number of students and graduates in the school of Pharmacy.

It has been thought advisable to leave the appointment of the examining committee, and the affixing of a standard of examination to the discretion of the Board of Trustees, providing only that that committee should be a stated one, to be appointed annually; as a committee thus appointed, without reference to any individual applicant, would be free from any suspicion of prejudice or partiality, which might

attach to a committee appointed specially to examine a particular candidate.

The alteration of Section 4th will be rendered necessary, if the amendment of Sec. 2d is adopted, because the present section refers to Sec. 2d as it now stands. The changes we have proposed in this section are, that candidates for associate membership, who are graduates, may be elected by the Board without reference to the College, and that the recommendation of the Board, and the unanimous vote of the members present of the College, shall be required for the election of such as are not graduates.

AMBROSE SMITH,
CHARLES ELLIS,
THOMAS P. JAMES
WILLIAM PROCTER, Jr.,
JOHN H. ECKY.

Philada., 11th mo. 5, 1849. *Committee.*

The presentation of this report produced considerable discussion, which, on motion, resulted in the adoption of Section 2d, as proposed by the Committee, in place of Section 2d, Law 5th, of the By-Laws of the College.

The proposed substitute for Section 4th of Law 5th, was deferred for the further consideration of our next Stated meeting.

The final report of the Committee on the Revision of the Pharmacopœia was read, and after some discussion upon several important amendments which they proposed, it was accepted, and the committee was discharged. The formulæ for the preparation of Hydrargyrum cum creta and Unguentum hydrargyri nitratis, were, on motion, referred to a special committee, consisting of Wm. Procter, Jr., Edward Parrish, and Ambrose Smith, with instructions to report at the next meeting.

An Essay on Unguentum Tabaci, by Wm. J. Allinson, of Burlington, N. J., was read, and on motion referred to the committee just appointed.

Some remarks were made on the subject of Acidum Nitricum by several members, and another member gave the results of his experience in the use of lard oil as a substitute for other oils in the preparation of ointments, both of which were, on motion, referred to the same committee, with instructions to report.

The Committee on the Pharmacopœia were charged by a resolution of Ninth month, to bring forward names of delegates to the Pharmacopœia Convention, to be held next year. They accordingly produced six names for the consideration of the College. Tellers were appointed, and the College proceeded to the election of three members; Daniel B. Smith, Charles Ellis, and Wm. Procter, Jr., having received a majority of votes, were declared duly elected as delegates to represent us in the Convention to be held in Washington.

On motion, it was

Resolved, That the delegates just appointed have power to fill vacancies in their body.

And the College adjourned.

DILLWYN PARRISH, Secretary.

Editorial Department.

Register.—About a year ago the Philadelphia College of Pharmacy, in view of the difficulties often experienced by members of the College in obtaining assistants or apprentices, and by these in obtaining situations, determined to establish a Register under the superintendence of the Secretary of the Board of Trustees, whereby, applicants, by recording their names, residences, and such hints of qualifications as they deemed proper, would have their wishes forwarded.

It must be evident that such a record, by exhibiting to employers the names and qualifications of a number of applicants, is a great advantage, inasmuch as, to a certain extent, they can select from the list before seeing the party.

Another advantage, incidental to the Register, is, that the Registrar takes the trouble to mention to each applicant the terms of apprenticeship recognized by the College, and other information bearing on his object.

The principal class of applicants consists of those who have had from six months to two or three years experience, and are, therefore, expecting salaries. The great number of such that are to be met with is a serious evil, indicating a disposition on the part of the young men to avoid that preparatory education, so imperatively necessary in our profession to qualify its votaries for their duties.

The Registrar has very properly discouraged those seeking places from any such short terms of apprenticeship, and has held up the importance of a regular and systematic study of the business, including attendance at the school of Pharmacy, which is now considered a condition of apprenticeship of members of the college.

All persons entering their names for apprenticeship are understood to desire a term of at least four years, with the intention of becoming Graduates of Pharmacy.

The Register is kept at the store of the Registrar, Edward Parrish, N. W. corner of Chesnut and 9th streets, to whom applicants for situations may apply without expense.

General Index to the American Journal of Pharmacy.—In view of the extensive and valuable information embraced by the American

Journal of Pharmacy, exhibiting as it does, a fair exposé of the discoveries and improvements in Pharmacy, Chemistry, and the collateral sciences, which have occurred during the twenty-one years of its existence, the Publishing Committee have for some time past entertained the idea of collating and publishing a general index to the work, which will greatly facilitate reference to the many valuable papers which embellish its pages, and which are often overlooked by essay writers on similar subjects, from the impediments offered by the necessity of referring to 21 indexes. During the past year Alfred B. Taylor, our worthy Inspector of Drugs, having felt this inconvenience in the investigations incident to his official duties, engaged himself in the preparation of a general index for his own convenience, and the Committee have embraced his liberal offer of preparing the index for the press. It is presumed that the work will extend to 60 octavo pages, and it is proposed to publish it gratuitously to subscribers in three parts, to be issued with the April, July, and October numbers of the Journal. It is presumed that after the issue of the last part, those receiving it, will have them bound together for preservation, in a separate volume, or with one of the volumes of the Journal.

MEMBERSHIP IN THE PHILADELPHIA COLLEGE OF PHARMACY.—By reference to the minutes of the College at page 90 our readers will observe that a very important change has occurred in the conditions required by the By-laws of the Institution, of those who apply for membership. Heretofore the applicant had only to be recommended by three members of the College to the Board, be of good moral character, and engaged in business, to be eligible. No examination was made of his qualifications, if not a graduate, and on election he received the following certificate: "The Philadelphia College of Pharmacy, instituted to promote and encourage a knowledge of that science, and to guard against abuses in the preparation and sale of medicines, reposing confidence in the *knowledge*, *skill*, and *integrity* of A—— B——, have associated him as a resident member thereof," &c. It must be apparent that the language of this certificate is almost as strong as that of the diploma given to graduates, and expressed in reference to an individual engaged in business, will have more influence with the public at large than the latter. The injustice of this to those young men whose laudable ambition has led them to acquire or seek the diploma, is too glaring to need explanation, and the fact has been one cause of avoiding the trouble of graduation by a number of the students of our School.

The present law requires that the qualifications of the applicant be investigated by a committee of examiners, who shall report to the Board, and whose favorable opinion shall be necessary to his election by that body. It will be seen by reference to the law at page 90 that this committee is appointed annually, and without reference to any particular applicant, being in fact the same committee who are empowered to act with the professors in examining the pupils of the school of Pharmacy; hence there can be no invidious feeling on their part against any of the applicants who may come forward.

We hope that the passage of this law may prove an additional stimulus to our students, to make sure of the diploma, which is, in fact, admission to membership also, when the graduate desires.

National Convention for the revision of the Pharmacopœia.—The call for this convention to meet in the City of Washington on the first Monday in May 1850, has been made by the proper authority, and we would call attention to the importance of an early appointment of delegates by the several bodies who have a right to representation. These bodies are "the several incorporated State medical societies, the incorporated Medical Colleges, the incorporated Colleges of Physicians and Surgeons, and the incorporated colleges of Pharmacy throughout the United States." The names of the delegates appointed are to be sent to Dr. G. B. Wood, Philadelphia, Vice President of the last Convention. We hope that speedy action in the matter will be taken by the societies, &c., interested.

In a letter just received from Charles A. Smith, Pharmaceutist, of Cincinnati, we are informed that a Pharmaceutical Association has been formed in that city. We are much pleased to hear this indication that our Western friends are awake to the cause of pharmaceutical reform, which, we understand, is much needed in that section. "The Western Lancet" will be their organ for the present, and we shall rejoice to see its pages teem with valuable papers owing their origin to this movement.

Mr. Smith has also communicated the following plan for detecting stearic and margaric acids, (and spermaceti) in sulphate of quinine, by means of chloroform. Six grains of the suspected salt are agitated in a test tube with a fluid drachm of chloroform for two minutes, the sulphate of qninine is then dissolved out by dilute sulphuric acid, the solution separated from the chloroform, which is then wahsed with distilled water, and suffered to evaporate gradually on a piece of paper. The fatty matter, if present to the extent of ten per cent. will be found on the paper, whilst the paper itself will have a greasy stain on it.